EMD Operating Procedures

Manual No. 5-21000-OPS-FO
Volume I:
Field Operations

EG&G ROCKY FLATS

THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES:

~~VOLUME~~ I: FIELD OPERATIONS (FO)
VOLUME II: GROUNDWATER (GW)
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FOR VOLUME I: FIELD OPERATIONS

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	Effective Date:	August 30, 1991
Category 2	Organization:	Environmental Management

TITLE:
AIR MONITORING AND
DUST CONTROL

Approved By: J. W. Langman 9/12/91
(Name of Approver) (Date)

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2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) contains instructions for air monitoring and dust control and is applicable to the intrusive activities at the 16 Operable Units (OU) at the Rocky Flats Plant (RFP). OUs are defined under the Resource Conservation Recovery Act (RCRA) Facilities Investigation/Remedial Investigation (RFI/RI) activities described in the interagency agreement (IAG). Intrusive activities that fall within the scope of this procedure are those with the potential for producing appreciable quantities of suspended particles that contain potentially hazardous substances (i.e., earth moving and drilling).

3.0 RESPONSIBILITIES AND QUALIFICATIONS

All construction personnel must complete 40-hours of Occupational Safety and Health Administration (OSHA)/Superfund Amendment and Reauthorization Act (SARA) training, 24-hours of on-the-job training (OJT), and 8-hours supervisor training (for supervisors only). Personnel are also required to attend any refresher courses.

All personnel are required to have a baseline physical. This physical must be in compliance with RFP standard 29 CFR 1910.120 and the site-specific Health and Safety Plan (H&SP).

4.0 REFERENCES

4.1 SOURCE REFERENCES

Hazardous Waste Operations and Emergency Response. CR Title 29, Part 1910.170.

DOE Order 5400.1, General Environmental Protection Program. November 9, 1988. Revision 1, June 29, 1990.

Reference Method for the Termination of Suspended Particulate Matter in the Atmosphere (High Volume Method). CFR Title 40, Part 50, Appendix B.

Ambient Air Specific Methods. U.S. Environmental Protection Systems, Volume II. EPA-600/4-77-027a.

Fugitive Particles. Colorado Air Quality Control Commissions (AQCC) Regulation, Section III.

3.0 PREREQUISITES

If site-specific anemometers are required in the OU area, they should be set up prior to the start of any work.

The following equipment is required where applicable according to the H&SP:

- Hard hats
- Safety shoes or protectors
- Coveralls
- Gloves
- Monitoring equipment (i.e., H-Nu and Ludlum Test equipment)
- Electrical safety gear
- Safety harness for high work
- Eye/Ear protection
- Organic vapor meter with assorted calibration tubes
- 4-Gas monitor (i.e., O2/H2O/CO/comb)
- Low volume (Lo-Vol)/high volume (Hi-Vol) air samplers (i.e., personal and stationary)
- Air sample scaler counter

- Portable radiation monitoring equipment
- Explosivity indicator/alarm
- Digital dosimetry
- Radiologic metering source calibration set
- Respirator and cartridges
- Soil moisture measuring device

The following documents are required where applicable according to the site specific work plan:

- Weekly Work Permit
- Excavation Permit(s)
- Subcontractor's Health & Safety Plan
- Approved Construction Schedule
- OSHA and Orientation Training Records
- Records of Physical Examination and Respirator Examination
- Health & Safety Plan (i.e., Project and Site-Specific)
- Welding Permits
- Land Use Permits
- Detailed Statement of Work and Project Work Plan

Hi-Vol and Lo-Vol air samplers are operational and calibrated in accordance with the manufacturer's recommendations prior to start of work. Health & safety plans are approved by the RFP Director of Environmental Management (EM) prior to start of work.

All equipment used for intrusive activities (i.e., drill rigs, support vehicles, and tools) will be inspected for functional operability and safety prior to start of work. Documentation and permits will also be in place at this time. Personal protective equipment (PPE) will be used and air monitoring will be performed in accordance with drilling site H&SP as well as this SOP.

4.0 PROJECT MANAGER RESPONSIBILITIES

It is the responsibility of the project manager to verify that all prerequisites are completed before beginning the intrusive activities at the OU. This includes verification that Hi-Vol and Lo-Vol air samplers are operational and calibrated before work begins.

4.1 MEASURE WIND SPEED

Anemometers will be placed in a representative area relative to the work site and in a location that does not interfere with site activities.

If the 15-minute average wind speed exceeds 15 mph, as measured by the site-specific anemometer, for two consecutive 15-minute periods for earth moving or other dust generation operations, terminate operations until 15-minute average wind speed is below 15 mph for two consecutive 15-minute periods.

Drilling operations and related investigative activities will be measured by an anemometer located in the construction yard at 881 Hillside. If the 15-minute average wind speed measures above 35 mph, terminate operations until the 15-minute average wind speed is below 35 mph.

Wind speed data will be collected and archived by Air Programs Group personnel. This data will be reported to the project manager on a monthly basis. Due to the nature of the testing, it is important to verify that anemometers are operational prior to start of work.

4.2 MEASURE SOIL MOISTURE CONTENT

Soil moisture content will be measured with a moisture meter for earth moving or dust generation operations (this excludes drilling). If surface soil moisture content measures below seven percent, wet (with water only) the top six inches of soil to prevent dust generation. Then, measure the soil moisture content again. Soil wetting will be performed in the vicinity of excavation activities and only when analytical soil samples are not affected.

The results of soil moisture tests, date, time, and reason for conducting the test will be documented in the project manager's log book.

4.3 MEASURE AIRBORNE DUST CONCENTRATIONS

The project manager will measure airborne dust concentrations as deemed necessary during dust generating activities. At a minimum, airborne dust concentrations will be measured prior to dust generating activities and when there is visible dust during operations.

Dust concentrations will be measured using a TSI "Piezoblance" Model 3500 Respirable Aerosol Mass Monitor (Lo-Vol air sampler) real-time instrument (or equivalent).

The results of dust concentration measurements, date, time, and reason for conducting the test will be documented in the project manager's log book. Industrial Hygiene may require and will perform additional testing with personal dust monitoring equipment.

4.4 COLLECTION OF HI-VOL SAMPLES

The project manager may request that Hi-Vol filters be collected off-schedule to respond to health & safety issues. If this occurs, the project manager must contact the Radioactive Ambient Air Monitoring Program (RAAMP) manager to have filters collected off-schedule.

Date, time, and reason for filters collected off-scheduled will be documented in the project manager's log book. Date and time of contact with the RAAMP manager must also be documented. Hi-Vol air samplers will be operated continuously, 24 hours-a-day, seven days-a-week.

FIELD DOCUMENT CONTROL

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EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
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TITLE:
FIELD DOCUMENT CONTROL

Approved by: J. W. Langman Jr. 9/12/91
(Name of Approver) (Date)

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2.0 PURPOSE

This procedure addresses the disposition of field datasheets and procedures which have been authenticated as part of the collection of Environmental Management field activities.

3.0 SCOPE

This procedure is intended for the use of trained personnel in controlled transmission of datasheets and authenticated procedures to the responsible Project Manager from the field.

4.0 REFERENCES

4.1 SOURCE REFERENCES

4.1.1 Environmental Restoration Interagency Agreement

4.1.2 DOE Order 5400.1, General Environmental Protection Program.

4.1.3 DOE Order 5700.6B. Quality Assurance.

4.1.4 Environmental Restoration Department Quality Assurance Program Description.

4.2 INTERNAL REFERENCES

4.2.1 ER & WM Administrative Procedure 16.01, Control of Corrective Action Reports.

5.0 PREREQUISITES

5.1 Datasheets must be properly completed per the applicable generation procedure.

5.2 Procedures with internal authentications must be properly authenticated per that procedure.

5.3 Each datasheet shall have a unique identification number.

6.0 LIMITATIONS AND PROCEDURES

None

7.0 PROCEDURE

7.1 Verify that the datasheets and authenticated procedures have been properly completed per the applicable procedures under, which they were generated.

7.2 Verify that each datasheet has a unique identification number generated in accordance with the datasheet original generation procedure.

7.3 If the verification in steps 7.1, 7.2, or 7.5.1 identify discrepancies with the applicable generation procedure, terminate this activity for the affected datasheet or authenticated procedure and prepare a Corrective Action Report.

NOTE

Datasheets and authenticated procedures identified in Corrective Action Reports will be dispositioned in accordance with the ER & WM Administrative Procedure 16.1 (Reference 4.2.1).

7.4 Maintain the datasheets and authenticated procedures is a location where they are protected from loss or damage.

7.5 At least once every seven days, prepare a package for transmission to the responsible project manager of the datasheets and authenticated procedures accumulated.

7.5.1 Collect the datasheets and authenticated procedures and review them for accuracy and completeness consistent with the requirements in the applicable generation procedure.

7.5.2 If datasheets or authenticated procedures are not consistent with the applicable generation procedures (see step 7.5.1), disposition the datasheet(s) or authenticated procedures(s) as described in step 7.3.

7.5.3 Obtain a Field Data Transmission Form.

7.5.4 Address the form to the responsible Project Manager and your complete address.

7.5.5 Record the Transmission Form Number.

NOTE

This number is "TFM", your initials, the date (mmddyy format), and the number of transmission forms you have generated that day, each separated by dashes. (Example: TFM-JWD-053191-1)

7.5.6 Record the following information on the Field Data Transmission Form (Form 1.2A) (Continuation sheets maybe used as needed):

1. Datasheet or procedure number,

2. Datasheet or procedure title, and

3. Datasheet or procedure date.

7.5.7 Record the page number and the total number of pages on the form and its continuation pages, if any.

7.5.8 Record the Transmission Form Number on the continuation pages, if any.

7.5.9 Attach the datasheets and authenticated procedures listed to the form.

7.5.10 Verify that all datasheets and authenticated procedures listed on the transmission form are attached.

7.5.11 If the datasheets and authenticated procedures were not attached per step 6.5.7 attach them or revise the form.

NOTE

If datasheets or authenticated procedures are lost a corrective Action Report shall be created per the ER & WM Administrative Procedure 16.01.

7.5.12 Authenticate the transmission form by:

1. Printing your name,

2. signing, and

3. recording date at the bottom of the transmission form.

7.6 Transmit the transmission form and attachments to the Project Manager.

8.0 AUTHENTICATION

Authentication of completion of this procedure is documented by signing the Field Data Transmission Form (Form FO.2A) in step 7.5.9.

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT FORM FO.2A

FIELD DATA TRANSMISSION FORM
(CONTINUATION SHEET)

FIELD DATA TRANS MISSION FORM
ENVIRONMENTAL MONITORING AND ASSESSMENT DIVISION
(Continuation Sheet)

Transmission Form Number______________ Page___ of ___

Number	Title	Date

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT **FORM FO.2A**

FIELD DATA TRANSMISSION FORM

FIELD DATA TRANS MISSION FORM
ENVIRONMENTAL MONITORING AND ASSESSMENT DIVISION

Transmission Form Number____________ Page___ of ___

To: ______________________________
____
____

From: ______________________________
____
____

Number	Title	Date

Authentication:

The signature below indicates that the requirements specified in SOP 1.2 have been complied with for completion of this form and the datasheets and authenticated procedures listed on this form including the specified continuation pages.

Printed Name	Signature	Date

GENERAL EQUIPMENT DECONTAMINATION

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Category 2 EG&G — ROCKY FLATS PLANT	Organization:	Environmental Management
~~ENVIRONMENTAL MANAGEMENT DEPARTMENT~~		

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TITLE:
GENERAL EQUIPMENT
DECONTAMINATION

Approved By: J.W. Langman 9/12/91
(Name of Approver) (Date)

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"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats for general equipment decontamination. The collection of environmental samples requires that all equipment associated with collecting these samples be cleaned.

This requirement will ensure that contaminants will not be introduced into the sample from external sources. These procedures establish the cleaning and decontamination methods for achieving that goal.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

The EG&G project manager has the overall responsibility for implementing this SOP. The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for ensuring that the procedures are followed by all subcontractor personnel.

All personnel performing these procedures are required to have the appropriate health and safety documentation and training as specified in the site-specific Health & Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary.

All project staff are responsible for reporting deviations from this SOP to the individual's project manager. The subcontractor's project manager will report deviations and nonconformances to the EG&G project manager.

4.0 REFERENCES

4.1 SOURCE REFERENCES

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual. U.S. Environmental Protection Agency. Athens, GA. 1986.

Federal Register, Volume 44, 40 CFR Part 136. "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act."

Test Methods for Evaluating Solid Waste. SW-846, 2nd Edition. U.S. Environmental Protection Agency. Washington, D.C. 1982.

Technical Enforcement Guidance Document (TEGD). EPA. 1986.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in these procedures are as follows:

- SOP FO.4, Heavy Equipment Decontamination
- SOP FO.7, Handling of Decontamination Water and Washwater
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP GW.2, Field Measurement of Surface Water Field Parameters

5.0 PROCEDURES AND EQUIPMENT

5.1 INTRODUCTION

This procedure describes the method for physically removing contaminants. It applies to chemical and radioactive decontamination of equipment used in field investigations. All equipment must be cleaned before sample collection, decontaminated between samples, and decontaminated before being removed from the site.

Sufficient clean equipment should be transported to the field so that an entire study can be conducted without the need for field cleaning. However, this is not possible for some specialized items of field equipment (such as, well drilling rigs, soil coring rigs, and other large pieces of field equipment). In addition, during particularly large-scale studies, it may not be practical or possible to transport to the field all of the cleaned field equipment required, as steam cleaning is not always possible, it may be necessary to decon smaller metal and stainless steel equipment outside the exclusion zone (see 5.3.1) in order to have these items ready for repeated use (bailers, split spoons, etc.). This will decrease the need to travel to the MDF and decontaminate these items.

The following definitions apply to the cleaning procedures:

1. The laboratory detergent must be a standard brand of phosphate-free laboratory detergent, such as Liquinox or the equivalent.

2. Tap water is defined as RFP drinking water. It may be obtained from hydrants or the RFP fire department. The use of an untreated potable water supply is not an acceptable substitute for RFP drinking water.

3. Distilled water is defined as any commercially available distilled water. A record of the distilled water supplier and the lot numbers supplied will be maintained. A sample from the initial batch of each lot number will be analyzed for volatile organics, inorganics (major anions), metals, and total dissolved solids.

The following are general comments:

- During cleaning operations, the substitution of a higher grade water (such as substituting distilled or organic-free water for tap water) is permitted and need not be noted as a variation.

- The brushes used to clean equipment as outlined in the various sections of this procedure must not be of the wire-wrapped type.

- Solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment must not be reused, except as specifically permitted.

- Field equipment or reusable sample containers needing cleaning must not be stored with clean equipment, sample tubing, or sample containers. Field equipment, reusable sample containers, disposable sample containers, and sample tubing that are not used may not be replaced in storage without being recleaned if these materials are transported to a facility or study site where contamination or suspected contamination was present.

- Previously cleaned sample containers and field equipment that are cleaned using the procedures outlined in the attachments will be stored in an area and manner that protects them from exposure to contaminants. Sample containers and field equipment will be stored separately from all other equipment and supplies, and from each other.

- Sample containers that contain a sample, regardless of the assumed or known level of hazard associated with that sample, must have all exterior surfaces decontaminated. For sample containers used in areas other than a controlled access area, a wipedown with disposable rags or toweling, or rinse with distilled water followed by drying with disposable rags or toweling, will suffice. Any visible dirt, water droplets, stains, or other extraneous materials must be removed. For containers used in controlled access areas, a more rigorous cleaning and/or radiation monitoring may be required.

- Solvents, including water and mineral acids, used for equipment cleaning purposes other than as described in this SOP must be justified and approved by the responsible EG&G project personnel and will be documented in logbooks. The laboratory to which the samples are sent must be informed as well.

5.2 CLEANING PROCEDURES FOR TEFLON®, OR GLASS FIELD SAMPLING EQUIPMENT USED FOR THE COLLECTION OF SAMPLES FOR TRACE ORGANIC COMPOUNDS AND/OR METALS ANALYSES

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned utilizing these procedures, it should be discarded.

1. Wash equipment thoroughly with laboratory detergent and tap water using a brush to remove any particulate matter or surface film.

2. Rinse equipment thoroughly with tap water.

3. Rinse equipment thoroughly with distilled water.

4. Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.

5. If the equipment is not decontaminated immediately after use, rinse the Teflon® or glass sampling equipment thoroughly with tap water in the field as soon as possible after use.

5.3 CLEANING PROCEDURES FOR STAINLESS STEEL OR METAL SAMPLING EQUIPMENT

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary, in extreme cases, to steam clean or sandblast equipment before proceeding with Step 1. Any sampling equipment that cannot be cleaned using these procedures should be discarded. If necessary, rinsate sampling frequency and procedures are specified in the Task QAPP.

1. Scrape and then steam clean gross contamination if needed.

2. Wash equipment thoroughly with laboratory detergent and tap water and use a brush to remove any particulate matter or surface film.

3. Rinse equipment thoroughly with tap water.

4. Rinse equipment thoroughly with distilled water.

5. Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.

6. If equipment is not decontaminated immediately after use, rinse the stainless steel or metal sampling equipment thoroughly with tap water in the field as soon as possible after use. This process will make later decontamination easier and will help prevent the spread of contamination.

5.3.1 Cleaning Steel or Metal Sampling Equipment Without Steam in the Field

1. Scrape gross contamination from equipment while in the exclusion zone.

2. Remove equipment from exclusion zone and wash in laboratory detergent and tap water; a brush may be used for particulate residual.

3. Rinse in tap water.

4. Triple rinse in distilled water.

5. Equipment may now either be wrapped in plastic to prevent cross-contamination or be re-used immediately.

5.4 CLEANING PROCEDURES FOR AUTOMATIC DECONTAMINATION WATER SAMPLING EQUIPMENT

5.4.1 General

Automatic samplers will be cleaned as follows:

1. The exterior and accessible interior portions (excluding the waterproof timing mechanism) of automatic samplers will be washed with laboratory detergent and rinsed with tap water.

2. The face of the timing case mechanism will be cleaned with a clean, damp cloth.

3. All silastic tubing (sample intake and pump tubing) will be discarded after use at site. SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers will be followed.

4. New precleaned, silastic pump tubing (see Subsections 5.5.1 and 5.5.2) will be installed.

5. When utilizing the samplers for collecting samples for metals and/or organic compounds analyses, all sampling train components that come in direct contact with the liquid sample must be of glass, Teflon®, or disposable silastic material.

5.4.2 Automatic Sampler Headers

1. Disassemble header and, using a bottle brush, wash with tap water and phosphate-free laboratory detergent.

2. Rinse thoroughly with distilled water.

3. Reassemble header, let dry thoroughly, and wrap with plastic.

5.4.3 Reusable Glass Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case cleaning of reusable glass composite containers will be accomplished using the procedure below.

(Note: Glass composite containers used to collect in-process decontamination water samples at industrial facilities shall be discarded after sampling.) All materials will be disposed in accordance with SOP FO.10 Receiving, Labeling and Handling Environmental Materials Containers.

1. Scrub with liquinox or other phosphate-free laboratory detergent mixed with tap water.

2. Rinse with tap water.

3. Repeat step one.

4. Rinse in tap water again, and then in a triple-distilled water rinse.

5. Dry in inverted position on drain rack or suitable rack in clean room as is applicable.

6. If equipment is still discolored, spotted, or has a noticeable film or scale, discard in accordance with SOP FO.10, Receiving,, Labeling, and Handling Environmental Materials Containers.

5.4.4 Reusable Plastic Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case use cleaning procedures as they are outlined in Subsection 5.4.3.

5.4.5 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode)

1. Use cleaning procedures as they are outlined in Subsection 5.4.3.

2. Replace bottles in covered, automatic sampler base; cover with plastic for storage.

5.4.6 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode) to be Used for Collecting Samples for Organic Compounds Analyses

Routinely, precleaned sample bottles will be purchased and used with automatic sampling devices.

1. Use cleaning procedures as they are outlined in Subsection 5.4.3.

2. Replace in covered, automatic sampler base; cover with plastic for storage and mark the base as follows: "Cleaned for organic analyses."

5.4.7 Bottle Siphons Used to Transfer Sample From Composite Container

1. Use a new siphon for each sampling location.

2. Use new 3/8-inch Teflon® tubing for samples collected for organic compounds analyses. The siphon and tubing should be flushed with sample thoroughly before use.

5.5 CLEANING PROCEDURES FOR SAMPLE TUBING

5.5.1 Silastic Rubber Pump Tubing Used in Automatic Samplers and Other Peristaltic Pumps

1. New tubing will be used for each automatic sampler set-up.

2. Teflon® tubing should be cleaned as follows:

   - The exterior will be hand scrubbed with a solution of a phosphate free, laboratory grade detergent and tap water, followed by rinsing with ample amounts of tap water by spraying. The tubing will then be triple rinsed thoroughly with approved distilled water by submerging or spraying.

   - Pump or pour laboratory detergent and water solution through tubing.

   - Pump approved distilled water through the tubing equivalent to 10 volumes of the tubing capacity.

5.5.2 Teflon® Sample Tubing

1. New Teflon® tubing should be used for each sampling point.
2. Teflon® tubing should be cleaned as follows using the procedures of Subsection 5.5.1.

5.5.3 Stainless Steel Tubing

1. Wash with laboratory detergent and tap water using a long, narrow, bottle brush.
2. Proceed with Steps 3.6 as outlined in Subsection 5.3.

5.5.4 Glass Tubing

Use new glass tubing, precleaned as follows:

1. Rinse thoroughly with distilled water.
2. Air dry.

3. Wrap tubing with plastic to prevent contamination.
4. Discard after use (see SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers).

5.6 MISCELLANEOUS EQUIPMENT CLEANING PROCEDURES

5.6.1 Well Sounders or Tapes Used to Measure Groundwater Levels

The procedure applies when this equipment is cleaned in the field.

1. Wash with laboratory non-phosphorus detergent and tap water.
2. Rinse with distilled water.
3. Equipment should be wrapped with non-reactive plastic to prevent contamination during storage or transit.

5.6.2 Submersible Pumps and Hoses Used to Purge Groundwater Wells

Where appropriate, pumps or bailers will be employed to purge and sample groundwater monitoring wells. This equipment will be cleaned as follows:

1. The external surfaces of the equipment will be vigorously hand scrubbed with a solution of a phosphate- free, laboratory grade detergent and tap water, followed by rinsing with water by submerging or spraying. The equipment will then be triple rinsed thoroughly with approved distilled water.

2. Internal surfaces will be decontaminated by pumping a solution of non-phosphate detergent and water through the equipment.

3. Displace the soap solution immediately by pumping distilled water equivalent to 10 volumes of the pump storage capacity through the equipment.

5.6.3 Field Analytical Equipment and Other Field Instrumentation

The exterior of sealed, watertight equipment should be washed with a laboratory detergent and rinsed with tap water before storage. The interior of such equipment may be wiped with a damp cloth if necessary. Ensure that the equipment is dry prior to storage.

Other field instrumentation should be wiped with a clean, damp cloth; and pH meter probes, conductivity probes, dissolved oxygen (DO) meter probes, etc. should be rinsed with distilled water before storage.

If desiccant is present in flow meters or other equipment, it should be checked and replaced, if necessary, each time the equipment is cleaned.

For operations involving environmental or background samples, water quality sampling equipment (such as Kemmerers, buckets, DO dunkers, dredges, etc.) may be cleaned with distilled water between sampling locations. A brush may be used to remove deposits of material or sediment, if necessary. If distilled water is used, water samplers should be flushed with ambient water at the next sampling location before the sample is collected. It should be emphasized that these procedures can only be used to clean equipment used for the collection of background samples.

Flow measuring equipment (such as, weirs, staff gauges, velocity meters, and other stream gauging equipment) will be cleaned with tap water after use between measuring locations.

5.6.4 Ice Chests and Shipping Containers

All ice chests and reusable containers will be steam cleaned thoroughly inside and out at MDF. If an ice chest is so contaminated it cannot be decontaminated, dispose of it in accordance with SOP FO.10, Receiving, Handling, and Labeling Environmental Materials Containers.

5.6.5 Uncontaminated and Potentially Contaminated Drums

Gray drums used for the temporary containment of uncontaminated or potentially contaminated solid environmental materials or environmental liquids will require decontamination prior to any additional use. It may also be necessary to decontaminate the exterior of gray drums due to radiological contamination. The following procedures will be used:

- General Procedure
  - All general gray drum decontamination will be performed at the Main Decontamination Facility (MDF)
- Ensure the drums are empty.
- Scrape or shovel out any residual contaminants.
- Place drum in wash rack with open end down.
- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position.

- General Decontamination

Thoroughly steam clean all surfaces of drum including lid, locking ring, bottom, and interior surface. A brush may be used for stubborn particulate matter.

  - Place top of the drum down in a clean area where it will not come in contact with contaminants to dry.

  - When dry, turn the drum upright and put the top and locking ring in place.

  - Return the decontaminated drum to EG&G.

- Surface Radiologically Contaminated Drums

  - Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position, or hand brushing will be used to complete decontamination.

  - Steam clean all exterior surfaces including drum bottom.

  - Remove the drum to a clean area where it will not come in contact with contaminants to dry.

  - When the drum is dry, subcontractor personnel will monitor the drum for radiological contamination.

  - If radiological contamination is still present, repeat decontamination as necessary.

- If verified free of radiological contamination by a Radiological Engineering-approved contractor Health and Safety Specialist, return the drum to the storage area.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) activities will be accomplished according to applicable project plans as well as quality requirements presented in this SOP.

This section outlines guidelines for specific quality control procedures to monitor the effectiveness of cleaning procedures given in the attachments.

6.1 EQUIPMENT RINSE SAMPLES

The effectiveness of the equipment cleaning procedures is monitored by submitting to the laboratory rinse water for low-level analysis of the parameters of interest. Select different pieces of equipment for this procedure, each time equipment is washed, so that a representative sampling approximately 10 percent of all equipment is obtained over the length of the project. Distilled water is poured over the representative equipment. This water is captured directly into Sample bottles. If a funnel is needed, glass or Teflon® will be used.

7.0 DOCUMENTATION

A permanent record of the implementation of this standard operating procedure (SOP) will be kept by documenting field observations and data. Observations and data will be recorded on Form FO.3A, Equipment Dectamination/Wash Checklist and Record.

U.S DEPARTMENT OF ENERGY ROCKY FLATS PLANT

EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD

I. General Information completed by: ______________________________

Name Date Phone no.

____

Subcontractor's Name

NOTE: Sections I and II will be completed by the same individual.

Equipment Manufacturer, Model and Common Name: ______________________________
Equipment Owner: ______________________________
Name and Phone Number of Person Responsible for the Equipment: ______________________________
Serial Number/Equipment Identification Number: ______________________________
Delivered to Decontamination Station by: ______________________________

Initial contaminate characterization of work area: (check one)

Not potentially contaminated ______
Potentially contaminated ______

II. Activity History

Where was equipment used? ______________________________
What was equipment used for? ______________________________
Types and volumes of water generated: (check as appropriate)

______ Purge ______ Gallons
______ Development ______ Gallons
______ Decon/Wash ______ Gallons
______ Rinse ______ Gallons

III. Actions At Central Decontamination Station

Yes	No	
______	______	The equipment was washed under the provisions of SOP No. FO.3, General Equipment Decontamination
______	______	Personnel Decontamination Station established as described in the applicable site-specific health and safety plan
______	______	Personal protective equipment (PPE) selected based upon work area PPE level

______	______	Specify PPE level utilized: ______ Level B ______ Level C ______ Level D
______	______	PPE inspected prior to donning
______	______	Wind direction checked prior to using pressurized spray (circle the direction the wind was blowing from) N NE E SE S SW W NW
______	______	Was particular attention devoted to equipment parts that contacted potentially contaminated medium?
______	______	Was personal decontamination completed as described in the applicable site-specific health and safety plan?

EG&G ROCKY FLATS PLANT	Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP	Procedure No.:	FO.4 Rev. 1
CONTROLLED DOCUMENT	Page:	1 of 22
	Effective Date:	August 30, 1991
Category 2 EG&G — ROCKY FLATS PLANT	Organization:	Environmental Management
ENVIRONMENTAL MANAGEMENT DEPARTMENT		

This is a RED Stamp

TITLE:
HEAVY EQUIPMENT
DECONTAMINATION

Approved By: J. W. Langman 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

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2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the procedures and equipment that will be used at the Rocky Flats Plant (RFP) to remove contaminants that may accumulate on heavy equipment. This SOP is applicable to all operations conducted as part of the Environmental Management (EM) Program.

This SOP describes the equipment and procedures required to complete decontamination of heavy equipment.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Radiological Engineering-approved contractor Environmental Health and Safety Specialist will perform radiation screening of all personnel and equipment leaving a work area. Screening will be performed in accordance with EG&G Radiological Operation Instruction 3.1 and screening procedures will follow Section 6.3, Contamination Monitoring of this SOP. For radiologically contaminated equipment, radiation screening will be performed following each field decontamination procedure until the equipment is free of radiological contamination or the decision is made to seal the contaminated area and transport the equipment to the central decontamination station. All radiologically contaminated heavy equipment transported to the central decontamination station will be screened by the Radiological Engineering-approved contractor Environmental Health and Safety Specialist following decontamination.

The subcontractor's project manager is responsible for ensuring that appropriate project staff and equipment are assigned to implement field decontamination, transport, and final decontamination of heavy equipment used by that subcontractor. The subcontractor's Site Safety Officer is responsible for performing Volatile Organic Compound (VOC) contamination screening of heavy equipment in accordance with the procedures given in Section 6.3, Contamination Monitoring, of this SOP. The subcontractor's Site Safety Officer is also responsible for performing radiological monitoring during contaminant reduction of heavy equipment in the field.

All personnel operating heavy equipment or company vehicles must have appropriate training and licenses.

4.0 REFERENCES

4.1 SOURCE REFERENCES

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. NIOSH/OSHA/USCG/EPA. October 1985.

Nuclear Weapon Accident Response Procedures (NARP) Manual. The Defense Nuclear Agency. January 1984. Change 1, July 1984.

Radiological Operating Instruction (ROI) 3.1. EG&G.

Standard Operating Safety Guides. EPA. November 1984.

Technical Enforcement Guidance Document (TEGD). EPA. 1986.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers

5.0 EQUIPMENT REQUIRED

5.1 CONTAMINATION REDUCTION IN THE FIELD

At the work site, contamination reduction will be accomplished by using the following items:

- Spatula
- Stiff bristle brushes
- Long-handled shovel
- Plastic sheeting
- Absorbent wipes
- Containers for potentially contaminated media
- A trailer and tow vehicle to transport heavy equipment from work areas known or suspected of containing surficial contamination to a central decontaminating station. Procedures to limit the spread of contamination during transport are provided in Subsection 6.4.

Contamination monitoring will be accomplished using the following instruments:

- Radiation detection equipment
- Organic Vapor Detector (OVD) (Hnu or equivalent)

5.2 MAIN DECONTAMINATION FACILITY

The most effective results will be obtained at a fixed decontamination station with provisions for ensuring that wash and rinse solutions rapidly drain away from the equipment being decontaminated and are containerized. Numerous equipment items and supplies must be furnished from various sources for the Main Decontamination Facility (MDF) to function as intended. The equipment listed below has been divided into two sections "Equipment Provided At The MDF" and "Equipment Provided By MDF Users."

Equipment And Supplies Provided At The MDF:

- Drains, pumps, and tanks for the collection and holding of decontamination and rinse solutions
- High pressure steam cleaner and high pressure wash and rinse systems
- Sufficient potable water to be used in the high pressure cleaning systems
- Portable power generator
- Splash curtains
- Wooden pallets

- A back-hoe or equivalent heavy equipment item outfitted with a "drum grappler"

- A two wheeled "dolly' designed to carry 55-gallon drums

- Overpacks to be used in the event a waste container is dropped or otherwise damaged and starts to spill wastes

- Opaque, water proof sheeting

- Plastic or nylon banding and the equipment necessary to band the sheeting to waste containers

- Long and short-handled stiff bristle brushes

- Wire brushes

- Wash and rinse buckets for equipment interiors

- Premoistened towelettes

- Duct tape or equivalent

- Windsock or equivalent method for decontamination workers to determine the wind direction

Equipment And Supplies Provided By MDF Users:

- Personal protective equipment (PPE) as required by the site-specific Health and Safety Plan.
- Waste containers for used PPE, non-reusable items required to complete decontamination, and soils dislodged during decontamination.
- An OVD to screen equipment and waste containers for an estimate of the effectiveness of decontamination efforts.
- Radiation detection equipment.
- Wash and rinse buckets necessary to establish a personal decontamination line identical to the one used at the work-site that resulted in contamination of the items being decontaminated.
- Any equipment of task-specific decontamination fluids required by a SOP or SOPA but that are not listed as being available at the MDF.
- Blank waste container labels to replace any completed labels that become dislodged or rendered unlegible during the decontamination process.
- In addition, MDF users are responsible for arranging to have a Radiological Engineering-approved contractor Health and Safety Specialist present if required.

6.0 PROCEDURES

6.1 INTRODUCTION

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by a Radiological Engineering-approved contractor Environmental Health and Safety Specialist. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations that have not been verified as background locations

Potentially contaminated work areas where groundwater plumes have been identified will be specified in the applicable work plans, as appropriate. Table FO.4-Al of Appendix FO.4A lists the IHSS work areas at RFP and Figure FO.10-Al (See SOP FO.10) shows the locations of the IHSSS. Figure FO.4-1 illustrates the identified groundwater plume areas and the americium area at OU No. 2. Table FO.4-1 lists the surface water and sediment stations (locations) that have been verified as background stations (uncontaminated) as of December, 1990. Other surface and sediment sampling stations will be added to this list as they become verified as background stations. Unless specified in the individual project work plans, all other work areas will be considered potentially contaminated and the procedures described in this SOP will be followed.

Heavy equipment used in a work area characterized as not potentially contaminated but where environmental monitoring conducted as the work progresses indicates the presence of contamination may also become contaminated. Since such contamination is not always easily discernible, it is necessary to assume that all equipment working an area, where the presence of such substances are known or suspected, has been contaminated. Effective decontamination procedures as described in this SOP will be implemented to minimize the potential for cross-contamination, offsite contaminant migration, and personnel exposure from improperly decontaminated equipment.

Heavy equipment used in an activity area characterized by EG&G as not potentially contaminated and where environmental monitoring conducted as the work progresses does not indicate the presence of contamination may be washed at a central decontamination station. Procedures established in Section 6.0 are not applicable, but Form FO.4A, Heavy Equipment Decontamination/Wash Checklist and Record, Sections 1, II, and Ill (Attachment 1), shall be completed.

6.2 CONTAMINATION REDUCTION IN THE FIELD

Although the most effective decontamination will generally be accomplished at a dedicated decontamination station, it is always desirable to accomplish a reduction in overall contamination in the field prior to moving equipment to a dedicated decontamination station. The goal of contamination reduction is to limit contaminant migration from the exclusion zone. Contamination reduction will occur near the work site within the exclusion zone.

Contamination reduction is accomplished by scraping, brushing, or otherwise removing as much obvious accumulation of the potentially contaminated media as possible. After the potentially contaminated media has been removed, monitoring will be accomplished by the subcontractor's Site Safety Officer. The subcontractor's Site Safety Officer will use procedures established in EG&G Radiological Operation Instructions (ROI) 3.1, Performance of Surface Contamination Surveys, to

TABLE FO.4-1

BACKGROUND SURFACE WATER AND SEDIMENT STATIONS

FOR

ROCKY FLATS PLANT

Surface Water Station Number	Sediment Station Number	Location
SWO04	SED 22	Rock Creek Drainage
SWO05	SED 20	Rock Creek Drainage
SWO06	SED 23	Rock Creek Drainage
SW108	SED 21	Rock Creek Valley Wall
SWO07	SED 04	Tributary of Walnut Creek
SWO41	SED 17	Tributary of Woman Creek
SWO80	SED 18	Tributary of Woman Creek (spring)
SWI04	SED 19	Tributary of Woman Creek (spring)
SW107	SED 16	Woman Creek Drainage
SWO42	SED 15	Offsite Gravel Pits

Draft Background Geochemical Characterization Report
Rocky Flats Plant, Golden, Colorado
rockwell\bkgdchem\sed-3a.jbb

conduct radiation monitoring during contamination reduction activities in the field. Sections 10.3 and 10.4 of the referenced ROI relate specifically to conducting monitoring of potentially contaminated heavy equipment during contamination reduction activities in the field. If monitoring indicated the presence of contamination, the contaminated areas win be wiped with heavy-duty premoistened towelettes (i.e., baby wipes) if doing so may reduce contamination. Following wipe down with the premoistened towelettes, the area will be remonitored. The preceding sequence of actions will be repeated until monitoring indicates that no further reduction in contamination is occurring. The contaminated area will then be sealed as described in Subsection 6.4. and the type, amount, and location of contamination recorded on Form FO.4A. The completed Form FO.4A will accompany the equipment and be provided to the individual responsible for completing decontamination at the main decontamination facility.

In the event disposable equipment is not available and equipment must be re-used immediately; as in the case of polybuterate liners for continuous samplers, etc., a field decontamination may be set up outside the exclusion zone. A field decontamination will including the following procedures:

- Scrape gross contamination from equipment while in the exclusion zone.
- Remove the item to be decontaminated from the exclusion zone and wash in a laboratory grade detergent and tap water. A brush may be used for residual particulates.
- Rinse the item in tap water.
- Triple rinse the item in tap water.
- Equipment may now either be wrapped in plastic to prevent cross-contamination or be reused immediately.

Substances removed during the contamination reduction process shall be handled as described in SOP FO.7, Handling of Decontamination Water and Wash Water, SOP FO.8, Handling of Drilling Fluids and Cuttings, and SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers.

6.2.1 Prework Activities

Limiting the amount of surfaces exposed to potential contamination is an effective method of reducing contamination. The following steps will be taken each time heavy equipment is to be used in any manner that has potential for resulting in the equipment becoming contaminated.

Once an item of heavy equipment has been taken into a potentially contaminated area, it will not normally be removed from the work area until all work that requires the presence of the equipment has been completed. Therefore care should be taken to ensure that fuel, oil, hydraulic fluid, and lubricant reservoirs are filled prior to entering the work area. For example, if "X" amount of monitoring wells are to be constructed within a given work area, then the drill rig being used will not leave the area until all drilling has been completed. Of course, augers and other like items will have to be decontaminated between bore holes. In order to reduce the potential for contamination of internal operating parts, heavy equipment will be removed from potentially contaminated areas and decontaminated if it becomes necessary to perform any maintenance on the equipment that may result in contamination of internal operating parts.

If an enclosed cab is present, it will be lined with plastic sheeting. As a minimum, the scat(s) and floor will be covered, and the sheeting secured in such a manner that it will not become dislodged during routine use.

After arriving at a work site, any compartments, tool boxes, and enclosed cabs shall be sealed by closing the doors and windows when such fixtures are present and sealing the seams around such fixtures with tape.

When at the work site, any fuel, oil, or hydraulic fluid fill ports and air cleaners will be sealed in a manner that blocks the entrance of dusts that may be radiologically contaminated unless to do so would disable a power system required to complete the field work.

6.3 CONTAMINATION MONITORING

Monitoring for potential VOC contamination and potential radiological contamination will be conducted on all heavy equipment used inside work areas characterized as potentially contaminated and on all heavy equipment used inside work areas characterized as not potentially contaminated but where environmental monitoring conducted as work progresses indicates the presence of contamination.

Radiological Engineering-approved Health and Safety Specialists will screen all equipment and personnel leaving the work area to ensure that no radioactively contaminated materials leave the work area. The Radiological Engineering-approved contractor Health and Safety Specialist will use procedures established in EG&G Radiological Operation Instruction (ROI) 3.1, Performance of Surface Contamination Surveys.

The subcontractor's health and safety representative assigned to the field team will monitor all personnel and equipment to ensure that no materials grossly contaminated with VOCs leave the area.

Special attention shall be devoted to tires, tracks, and any other surfaces that have been in direct contact with the environmental media being investigated or that have been in direct contact with other items of equipment or personnel that have been in direct contact with the environmental media being investigated. Special attention shall also be devoted to any surfaces where accumulations of the environmental media being investigated exist.

6.4 MOVEMENT OF CONTAMINATED HEAVY EQUIPMENT

A trailer will be required to move equipment to a central decontamination station if contamination monitoring indicates contamination on surfaces such as tires or tracks or any other item which may contact the ground or become dislodged when the equipment is moved. Any trailer used to move heavy equipment to a central decontamination station will be decontaminated and the effectiveness of decontamination verified in the same manner as the equipment it was used to move.

Following field contamination reduction, equipment surface areas remaining contaminated shall be covered with plastic sheeting prior to the equipment departing the exclusion zone. Edges of the sheeting will be held in place by duct tape or a similar type tape.

Contaminated heavy equipment will not be moved at speeds greater than 5 miles per hour. Heavy equipment will not be moved over paved roads during the hours of peak traffic flow, such as the beginning or end of the work day.

6.5 MAIN DECONTAMINATION FACILITY

The main decontamination facility is located adjacent to and south of the 903 Pad. Information regarding the configuration, operation, and maintenance of the central decontamination station has been prepared and may be found in SOP FO.12, Decontamination Facility Operations. The following procedures are presented in the chronological order in which they should normally occur:

6.5.1 Predecontamination Procedures

- Review Form FO.4A, Heavy Equipment Decontamination Checklist and Record to determine the level of PPE required by the applicable site-specific health and safety plan and the correct decontamination procedure.

- Establish a personnel decontamination line as described in the applicable site-specific health and safety plan.

- Personal protective equipment (PPE) will be used as required in the applicable Health and Safety Plan.

- Upon arrival at the MDF, the equipment to be decontaminated and any accompanying waste containers will be set on the ground at locations that will permit one item or group of similar items at a time to be placed within the screened-in portion of the MDF.

- If radiological monitoring during the contamination reduction process documented the suspected presence of radioactive substances that could not be removed during the contamination reduction process, arrangements will be made for a Radiological Engineering-approved contractor Health and Safety Specialist to verify the effectiveness of decontamination.

- Areas that have been sealed against exposure to the environment as required by this SOP, (due to the suspected presence of contamination that could not be removed during the contamination reduction process at the work area) will be clearly marked so that the area can be identified and monitored.

- Surfaces suspected of having tightly bound contamination that could not be removed during the contamination reduction process will be decontaminated first. Procedures specified in this SOP will be followed. The MDF user will use an OVD or radiation monitor as appropriate to screen the surfaces suspected of having had tightly bound contamination. If the screening indicates the contamination has been removed, the equipment will be moved out of the MDF and returned to service only if the type of contamination that had previously been suspected was organic contamination. If the presence of radioactive contamination was suspected, the equipment will be moved out of the MDF, parked nearby, and held out of service until verification of decontamination as described in Subsection 6.5.3, Post Decontamination Procedures, has occurred.

- Verification of effectiveness of decontamination is not required for heavy equipment surfaces that were found to be contaminant free by monitoring at the work area conducted as part of the contamination reduction process.

6.5.2 Decontamination Procedures

- Enclosed cabs

    - Remove plastic lining/covers and dispose as contaminated waste.

    - Wipe down interior surfaces.

    - Use a brush to apply a detergent and water solution to the floor.

    - A low-pressure water hose should be used to flush the detergent and water solution from the cab.

- Seal the cab by closing doors, windows, and vents.

- Engine compartments

  - Although engines should not normally become contaminated, the engine area will be visually inspected for signs (e.g., mud splashes) of potential contamination.

  - Any dry air filters servicing equipment used in a solid waste management unit will be removed and handled as radiologically contaminated waste.

  - If there are not any signs of contamination, the compartment should be left as is and sealed during decontamination of exterior surfaces.

  - If there appears to be contamination present, someone familiar with the engine will employ the procedures for decontaminating exterior surfaces while avoiding damage to moisture-sensitive engine components. Moisture-sensitive components may be covered with plastic during engine decontamination. The components will then be hand wiped with disposable moistened towels, following general engine decontamination.

  - Following engine decontamination, the engine compartment should be sealed during decontamination of exterior surfaces.

- Exterior surfaces including trailers used to move equipment to the decontamination station

  - Inspect equipment and trailers for obvious accumulation of contaminated media that can be easily dislodged by physical means (see Subsection 6.2, Contamination Reduction in the Field).

- Use a pressurized detergent and water solution, followed by a pressurized potable water rinse.

- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position, or hand brushing will be used to complete decontamination.

• Start at the uppermost surface and work downward including the underside of the equipment.

• Pay particular attention to areas such as tires that came into contact with a potentially contaminated media and areas that show visual signs of contamination such as mud splashes on the inside of fenders or accumulations of water in a bed.

• Move the equipment and decontaminate the equipment surfaces that have been in contact with the decontamination station floor.

• Arrange for a Radiological Engineering-approved contractor Health and Safety Specialist to conduct a smear test as described in ROI 3.1, Performance of Surface Contamination Surveys, to verify removal of radiological contamination if such contamination had been noted on the Form FO.4A when the equipment arrived. Repeat the decontamination procedures for exterior surfaces if radiological contamination is found and then repeat the monitoring. If contamination is still present after completing the second decontamination procedure, contact the appropriate EG&G Construction Manager.

- Equipment

  - Items which come into direct contact with environmental samples collected for laboratory analysis will be decontaminated as described in SOP FO.3, General Equipment Decontamination. Examples of such items are sample containers.

  - Equipment used inside contaminated activity areas but that do not directly contact samples will be decontaminated by a pressurized detergent and water solution followed by a pressurized potable water rinse. Examples of such items include augers, drilling rods, and any hand tools used during drilling. Decontamination will be verified as described in Subsection 6.5.3, Post Decontamination Procedures.

6.5.3 Post Decontamination Procedures

- Equipment surfaces that could not be decontaminated in the field during contamination reduction activities will undergo verification of decontamination at the MDF. Verification of organic decontamination will be accomplished with an OVD by the MDF user responsible for decontaminating the equipment. Verification of radiological decontamination will be accomplished by a Radiological Engineering-approved contractor Health and Safety Specialist using the instruments and techniques specified in ROI 3.1, Performance of Surface Contamination Surveys.

- Decontaminate brushes and other reusable items of decontamination equipment as described in SOP FO.3, General Equipment Decontamination.

- Complete personal decontamination as described in the applicable site-specific health and safety plan.

- Document decontamination using Form FO.4A, Heavy Equipment Decontamination Record.

- SOP FO.7, Handling of Decontamination Water and Wash Water, provides pertinent guidance which should be followed.

7.0 DOCUMENTATION

Form FO.4A, Heavy Equipment Decontamination Record, shall be used to document information required by this SOP. Completed forms will be maintained as part of the project files. Sections I and II of the form will be completed by the person delivering heavy equipment for decontamination. Sections III, IV, and V will be completed by the person conducting the decontamination operation.

HEAVY EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD

I. General Information completed by: ______________________________

Name Date

____

Subcontractor's Name

NOTE: Sections I and II will be completed by the same individual.

Vehicle Manufacturer, Model and Common Name:______________________
Equipment Owner:______________________
Name and Phone Number of Person Responsible for the Equipment:______________________
Serial Number/Vehicle Identification Number (VIN):______________________
Delivered to Decontamination Station by:______________________

Initial contaminate characterization of work area: (check one)

Not potentially contaminated_______
Potentially contaminated _______

Equipment delivered to Main Decontamination Facility on a trailer due to VOC or radiological contamination. ______ Yes ______ No

Were areas found to be contaminated covered with plastic sheeting taped in-place prior to movement? ______ Yes ______ No ______ No contamination present

II. Exposure History

Where was equipment used? ______________________
What was equipment used for? ______________________
Did verified environmental monitoring indicate the presence of contamination? ____ Yes ____ No
Name of person who accomplished environmental radiological monitoring in the field

____

Name Date Phone No. Employer's Name

Results of Radiological monitoring of equipment after final contamination reduction in the field.

_______ None detected
_______ Less than 250 cpm - Specify measured cpm ___
_______ Greater than 250 cpm - Specify measured cpm ___

If areas of measurable alpha radiation were found, clearly identify those areas by providing both a written description sufficient to enable a second party to locate the area and include a sketch of the area showing its location in relation to major components of the equipment being decontaminated.

Results of VOC monitoring after final contamination reduction in the field.

_______ VOCs at background levels
_______ VOCs greater than background

III. Actions At Main Decontamination Facility

Yes No

__ _ The equipment was washed under the provisions of SOP No. FO.4, Heavy Equipment Decontamination, Subsection 6.1.
__ _ Personnel Decontamination Station established as described in the applicable site specific health and safety plan.
__ _ Personal protective equipment (PPE) selected based upon results of radiological monitoring.
__ _ Specify PPE level utilized: ___ Level B ___ Level C ___ Level D
__ _ PPE inspected prior to donning.
__ _ Wind direction checked prior to using pressurized spray (circle the direction the wind was blowing from).
N NE E SE S SW W NW
__ _ Enclosed cab present and decontaminated.
__ _ Engine compartment inspected and decontaminated as required.
__ _ Were decontamination and rinse operations started at the uppermost surfaces?
__ _ Was particular attention devoted to areas such as tires that contacted a potentially contaminated medium and to areas identified as having a measurable level of alpha radiation?
__ _ Was the equipment moved to decontaminate surfaces that had been in contact with the decontamination station floor?
__ _ Was equipment used to decontaminate the heavy equipment decontaminated as described in SOP FO.3, General Equipment Decontamination?
__ _ Was personal decontamination completed as described in the applicable site-specific health and safety plan?

IV. Equipment Monitoring to Verify Removal of Contamination

Name of Radiological Engineering-approved contractor Health and Safety Specialist conducting smear test as described in ROT 3.1, Performance of Surface Contamination Surveys:

____
Name   Date

Results of smear test:______________________________

Name of person conducting VOC monitoring:

____
Name   Date

Results of VOC monitoring:______________________________

V. Follow-up Decontamination

__ Not Required
__ Required for the following area/surfaces

____

____

____

Results of follow-up smear test:______________________________

___ Decontamination completed
___ Decontamination incomplete and EG&G Construction Manager notified

____
Name   Date

APPENDIX FO.4A

TABLE FO.4-A1
ROCKY FLATS PLANT
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
101	207 SOLAR EVAPORATION PONDS
102	OIL SLUDGE PIT
103	CHEMICAL BURIAL
104	LIQUID DUMPING
105	OUT-OF-SERVICE FUEL TANKS
	105.1 - WESTERNMOST TANK
	105.2 - EASTERNMOST TANK
106	OUTFALL
107	HILLSIDE OIL LEAK
108	TRENCH T-1
109	TRENCH T-2
110	TRENCH T-3
	TRENCHES T-4 TO T-11
	111.1: TRENCH T-4
	111.2: TRENCH T-5
	111.3: TRENCH T-6
	111.4: TRENCH T-7
	111.5: TRENCH T-8
	111.6: TRENCH T-9
	111.7: TRENCH T-10
	111.8: TRENCH T-11
112	903 DRUM STORAGE AREA
113	MOUND AREA
114	PRESENT LANDFILL
115	ORIGINAL LANDFILL
116	MULTIPLE SOLVENT SPILLS
	116.1: WEST LOADING DOCK AREA
	116.2: SOUTH LOADING DOCK AREA

Note: This information is based on the administrative record including the information submitted in the hazardous and low-level mixed waste Part B application dated November 1, 1985, as modified by the subsequent revision dated November 28, 1986, as modified by the subsequent revision dated December 15, 1987, and the transuranic mixed waste Part B application submitted July 1, 1988, Thereafter referred to as the applications. This information is also based on independent review of historical aerial photographs of the facility and independent review of facility submittals.

TABLE FO.4-A1 (cont.)

INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
117	CHEMICAL STORAGE
	117.1: NORTH SITE
	117.2: MIDDLE SITE
	117.3: SOUTH SITE
118	MULTIPLE SOLVENT SPILLS
	118.1: WEST OF BUILDING 731
	118.2: SOUTH END OF BUILDING 776
119	MULTIPLE SOLVENT SPILLS
	119.1: WEST AREA
	119.2: EAST AREA
120	FIBERGLASSING AREAS
	120.1: NORTH OF BUILDING 664
	120.2: WEST OF BUILDING 664
121	ORIGINAL PROCESS WASTE LINES
122	UNDERGROUND CONCRETE TANK
123	VALVE VAULT 7
	123.1: VALVE VAULT 7
	..... 4,000 GALLON TANK #67)
125	HOLDING TANK
126	OUT-OF-SERVICE PROCESS WASTE TANKS
	126.1: WESTERNMOST TANK
	126.2: EASTERNMOST TANK
127	LOW-LEVEL RADIOACTIVE WASTE LEAK
128	OIL BURN PIT NO. 1
129	OIL LEAK
130	RADIOACTIVE SITE - 800 AREA SITE #1
131	RADIOACTIVE SITE - 700 AREA SITE $1
132	RADIOACTIVE SITE - 700 AREA SITE #4
133	ASH PITS
	133.1:ASH PIT 1-1
	133.2:ASH PIT 1-2
	133.3:ASH PIT 1-3
	133.4:ASH PIT 1-4
	133.5:INCINERATOR
	133.6:CONCRETE WASH PAD
134	LITHIUM METAL DESTRUCTION SITE
135	COOLING TOWER BLOWDOWN

TABLE FO.4-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
136	COOLING TOWER PONDS
	136.1 : NORTHEAST CORNER OF BUILDING 460
	136.2 : WEST OF BUILDING 460
	136.3 : S. OF BLDG. 460, W. OF BLDG. 444
137	COOLING TOWER BLOWDOWN - BLDG. 774
138	COOLING TOWER BLOWDOWN - BLDG. 779
139	CAUSTIC/ACID SPILLS
	139.1: HYDROXIDE TANK AREA
	139.2: HYDROFLUORIC ACID TANKS
140	REACTIVE METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142.1: A-1 POND
	METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142.1: A-1 POND
	142.2: A-2 POND
	142.3: A-3 POND
	142.4: A-4 POND
	142.5: B-1 POND
	142.6: B-2 POND
	142.7: B-3 POND
	142.8: B-4 POND
	142.9: B-5 POND
	142.10: C-1 POND
	142.11: C-2 POND
	142.12 NEWLY IDENTIFIED A-5 POND
143	OLD OUTFALL
144	SEWER LINE BREAK
145	SANITARY WASTE LINE LEAK
146	CONCRETE PROCESS WASTE TANKS
	146.1: 7,500 GALLON TANK (#31)
	146.2: 7,500 GALLON TANK (432)
	146.3: 7,500 GALLON TANK (*34W)
	146.4: 7,500 GALLON TANK (#34E)
	146.5: 3,750 GALLON TANK (*30)
	146.6: 3,750 GALLON TANK (#33)
147	PROCESS WASTE LEAKS
	147.1: MAAS AREA
	147.2: OWEN AREA
148	WASTE SPILLS
149	EFFLUENT PIPE

TABLE FO.4-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
150	RADIOACTIVE LIQUID LEAKS (8)
	150.1: NORTH OF BUILDING 771
	150.2: WEST OF BUILDING 771
	150.3: BETWEEN BUILDINGS 771 ant 774
	150.4: EAST OF BUILDING 750
	150.5: WEST OF BUILDING 707
	150.6: SOUTH OF BUILDING 779
	150.7: SOUTH OF BUILDING 776
	150.8: NORTHEAST OF BUILDING 770
151	FUEL OIL LEAK
152	FUEL OIL TANK
153	OIL BURN PIT NO. 2
154	PALLET BURN SITE
155	903 LIP AREA
156	RADIOACTIVE SOIL BURIAL
	156.1: BUILDING 334 PARKING LOT
	156.2: SOIL DUMP AREA
157	RADIOACTIVE SITE
	157.1: NORTH AREA
	157.2: SOUTH AREA
158	RADIOACTIVE SITE - BLDG. 551
159	RADIOACTIVE SITE - BLDG. 559
160	RADIOACTIVE SITE - BLDG. 444 PK LOT
161	RADIOACTIVE SITE - BLDG. 664
162	RADIOACTIVE SITE - 700 AREA SITE #2
163	RADIOACTIVE SITE - 700 AREA SITE #3
	163.1: WASH AREA
	163.2: BURIED SLAB
164	RADIOACTIVE SITE - 800 AREA SITE #2
	164.1: CONCRETE SLAB
	164.2: BUILDING 886 SPILLS
	164.3: BUILDING 889 STORAGE PAD
165	TRIANGLE AREA
166	TRENCHES
	166.1: TRENCH A
	166.2: TRENCH B
	166.3: TRENCH C
167	SPRAY FIELDS - THREE SITES
	167.1: NORTH AREA
	167.2: POND AREA
	167.3: SOUTH AREA
168	WEST SPRAY FIELD

TABLE FO.4-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF NO.	SITE NAME
169	WASTE DRUM PEROXIDE BURIAL
170	P.U.& D. STORAGE YARD - WASTE SPILLS
171	SOLVENT BURNING GROUND
172	CENTRAL AVENUE WASTE SPILL
173	RADIOACTIVE SITE - 900 AREA
174	P.U.&D. CONTAINER STORAGE FACILITIES (2)
175	S&W BLDG. 980 CONTAINER STORAGE FACILITY
176	S&W CONTRACTOR STORAGE YARD
177	BUILDING 885 DRUM STORAGE AREA
178	BUILDING 881 DRUM STORAGE AREA
179	BUILDING 865 DRUM STORAGE AREA
180	BUILDING 883 DRUM STORAGE AREA
181	BUILDING 334 CARGO CONTAINER AREA
182	BUILDING 444/453 DRUM STORAGE AREA
183	GAS DETOXIFICATION AREA
184	BUILDING 991 STEAM CLEANING AREA
185	SOLVENT SPILL
186	VALVE VAULT 12
187	ACID LEAKS (2)
188	ACID LEAK
189	MULTIPLE ACID SPILLS
190	CAUSTIC LEAK
191	HYDROGEN PEROXIDE SPILL
192	ANTIFREEZE DISCHARGE
193	STEAM CONDENSATE LEAK
194	STEAM CONDENSATE LEAK
195	NICKEL CARBONYL DISPOSAL
196	WATER TREATMENT PLANT BACKWASH POND
197	SCRAP METAL SITES
198	VOCs IN GROUND WATER
199	CONTAMINATION OF THE LAND SURFACE
200	GREAT WESTERN RESERVOIR
201	STANDLEY RESERVOIR
202	MOWER RESERVOIR
203	INACTIVE HAZARDOUS WASTE STORAGE AREA
204	ORIGINAL URANIUM CHIP ROASTER
205	BLDG. 460 SUMP 43 ACID SIDE
206	INACTIVE D-836 HAZARDOUS WASTE TANK
207	INACTIVE 444 ACID DUMPSTER
208	INACTIVE 444/447 WASTE STORAGE AREA
209	SURFACE DISTURBANCE SOUTHEAST OF BLDG. 881
210	UNIT 16, BUILDING 980 CARGO CONTAINER

TABLE FO.4-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF NO.	SITE NAME
211	UNIT 26, BUILDING 881 DRUM STORAGE
212	UNIT 63, BUILDING 371 DRUM STORAGE
213	UNIT 15, 904 PAD PONDCRETE STORAGE
214	UNIT 25, 750 PAD PONDCRETE AND SALTCRETE STORAGE
215	UNITS 55.13, 55.14, 55.15, 55.16 - TANKS T-40, T-66, T-67, T-68
216	EAST SPRAY FIELDS 216.1: NORTH AREA 216.2: CENTER AREA 216.3: SOUTH AREA
217	UNIT 32, BUILDING 881, CN- BENCH SCALE TREATMENT

HANDLING OF PURGE AND DEVELOPMENT WATER

EG&G ROCKY FLATS PLANT		**Manual:**	**5-21000-OPS**
~~EMD MANUAL~~ OPERATION SOP		**Procedure No.:**	**FO.5, Rev. 1**
		Page:	**1 of 8**
		Effective Date:	**August 30, 1991**
Category 2		**Organization:**	**Environmental Management**

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

TITLE:
HANDLING OF PURGE AND DEVELOPMENT WATER

Approved By: J. W. Langman 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the procedures that will be used for containing, moving, and emptying wastewater generated during well development at the Rocky Flats Plant (RFP).

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for coordinating the removal and transfer of all environmental materials from the project work area.

The subcontractor is also responsible for moving purge and development water to holding tanks located at the central EG&G decontamination facility.

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums must have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until relinquished to EG&G. These inspections will ensure that drum integrity is maintained.

Radiological Engineering-approved contractor Environmental Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave the work area.

EG&G's Waste Operations personnel are responsible for the collection, movement, storage, treatment, and disposal of environmental liquids from the main decontamination facility.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

EG&G. Policies: Rocky Flats Plant. Use and Color Coding of Drums. RFPM MAT 20-005. November 3, 1989.

Environmental Protection Agency (EPA). A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

RCRA Facility Investigation Guidance. Interim Final. May 1989.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are:

- SOP FO.3, General Equipment Decontamination
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.8, Handling of Drilling Fluids and Cuttings

- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO.16, Field Radiological Measurements

5.0 EQUIPMENT

5.1 EQUIPMENT NEEDED TO HANDLE PURGE AND DEVELOPMENT WATER

The following is a list of equipment needed for the proper handling of purge and development water:

- 55-gallon, open top (removable top), gray drums or liquid containers appropriately sized for the task
- Hand, electric, or gas powered pumps
- An organic vapor detector (OVD)
- A field radiation monitor
- Shovel (scoop type)
- Clear plastic sheeting for placing around the well head to prevent cross contamination of the surface

- Splash protective and personal protective equipment as required by the site-specific Health and Safety Plan

6.0 HANDLING OF PURGE AND DEVELOPMENT WATER

Water used during the development of an environmental monitoring well is considered purge and development water. Monitoring well development is the process by which the drilling fluids and mobile particulates are removed from within and adjacent to newly installed wells. This process can also be used to remove sediment or other built-up materials from older wells.

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Environmental Health and Safety Specialists. Work areas associated with the Environmental Management (EM) program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations that have not been verified as background locations

See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers for specific work areas currently characterized as potentially contaminated. Appendix A (SOP FO.10) is a list of the IHSSs at RFP.

Solid environmental materials generated during EM field operations will be containerized as they are generated in 55-gallon gray drums until associated samples are characterized. Environmental liquids will be moved to holding tanks located at the main decontamination facility (see SOP FO.12, Decontamination Facility Operations). The use of field monitors, including an OVD and radiation monitor, for the detection of volatile organics and radionuclides is discussed in SOPs FO.8, Handling of Drilling Fluids and Cuttings; FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs); and FO.16, Field Radiological Measurements.

The types of contamination which may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

Regardless of the work area characterization, all purge and development water will be placed in the liquid holding tanks at the main decontamination facility. In the field, the purge and development water will be temporarily stored in 55-gallon, open top, gray drums or appropriately sized containers. Liquid containers will be marked with the words "NONPOTABLE PENDING ANALYSIS" as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. Field personnel will decant the environmental liquids from one drum (or container) to another (or from a trough to a drum or transfer container) prior to moving if the amount of sludge or sediment within the environmental liquids is substantial. The residual sediment will be drummed as solid environmental materials (see SOP FO.8, Handling of Drilling Fluids and Cuttings). Characterization will be based on analytical results of the samples corresponding to the cuttings associated with the drill site.

The liquid containers will be moved to EG&G's main decontamination facility by the subcontractor. The decontamination facility will have an area specifically designed for environmental liquids. The environmental liquids area includes a process for separating solids from the liquids. The subcontractor will empty the entire container's contents into this environmental liquids area. (See SOP FO.12, Decontamination Facility Operations, for details pertaining to the environmental liquids area.)

The liquid containers will be decontaminated between each use. If gray drums are used, pertinent information regarding the use of gray drums will be documented on the Drum Field Log Form (Form FO.10A, see Section 8.0 - Documentation).

The drums containing residual sediment will be brought to the drum transfer area at the main decontamination facility and transferred to the custody of EG&G Waste Operations personnel.

Environmental liquid containers will be decontaminated between each use.

7.0 DECONTAMINATION

Equipment used for the development of a monitoring well located within a potentially contaminated work area will be decontaminated according to SOP FO.3, General Equipment Decontamination. If positive readings above background were detected during field monitoring within not potentially contaminated work areas, equipment will be decontaminated according to SOP FO.3.

In not potentially contaminated work areas, where no verified detections were encountered during field monitoring, the equipment used will be power sprayed and rinsed.

Decontamination and wash water will be disposed according to SOP FO.7, Handling of Decontamination Water and Wash Water.

8.0 DOCUMENTATION

8.1 DRUM FIELD LOG FORM

A Drum Field Log Form (Form FO.10A) will be kept on each gray drum used to move environmental liquids. The Drum Field Log Form will be used as a "cradle to grave" record. The following information will be documented on the form:

- Drum ID Number
- Date of issuance
- Location in field
- Contents
- Fill date
- Date of decontamination and location
- Date returned to EG&G

Entries made on the Drum Field Log Form may be supported with entries in a field logbook.

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

DRUM FIELD LOG FORM

FORM FO.10A

NAME OF THE SUBCONTRACTOR .... ____________________

DRUM ID NUMBER WITH SUBCONTRACTOR'S ID............. ____________________

LOCATION AND DATE OF ISSUANCE .... LOC ____________ DATE ____________

NAME AND LOCATION OF FIELD ACTIVITY .... NAME ____________ LOC ____________

ASSOCIATED WELL, BORING, OR SAMPLING
LOCATION .... NAME ____________ ____________

CONTENTS OF DRUM .... ____________

SUBSURFACE INTERVALS (IF SOILS) .... ____________ ____________

BAG #S (IF PPE)

ASSOCIATED SAMPLE ID #S .... ____________ ____________

DATE DRUM WAS FILLED .... ____________

SIGNATURE OF PERSON FILLING THE DRUM .... ____________

IF SOLID ENVIRONMENTAL MATERIALS

LOCATION OF TEMPORARY STORAGE AREA .... ____________

DATE DRUM RETURNED TO EG&G .... ____________

SIGNATURE OF EG&G REPRESENTATIVE .... ____________

IF ENVIRONMENTAL LIQUIDS

DATE AND LOCATION WHERE CONTENTS WERE
EMPTIED AND DECONNED .... DATE ____________ LOC ____________

(EXAMPLE: 2/18/91 DECON PAD #____)

EG&G ROCKY FLATS PLANT	Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP	Procedure No.:	FO.6, Rev. 1
CONTROLLED DOCUMENT	Page:	1 of 10
	Effective Date:	August 30, 1991
Category EG&G — ROCKY FLATS PLANT	Organization:	Environmental Management
~~ENVIRONMENTAL MANAGEMENT DEPARTMENT~~		

This is a RED Stamp

TITLE:
HANDLING OF PERSONAL
PROTECTIVE EQUIPMENT

Approved By: J. W. Langman Jr. 9/1/91

(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

2.0 PURPOSE AND SCOPE

The environmental materials generated from Environmental Management (EM) field activities will be handled in accordance with the Rocky Flats Plant (RFP) EM program. This standard operating procedure (SOP) describes procedures that will be used by subcontractors at RFP to handle disposable personal protective equipment (PPE). These procedures are intended to be sufficiently detailed so that conformance with them will result in reliable handling and management of PPE used during EM field activities.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training or licenses.

The subcontractor's site manager is responsible for coordinating the removal and transfer of all environmental materials and refuse from the project work area.

Disposable PPE considered not potentially contaminated (see Section 6.3) will be bagged, sealed, labeled, and placed in designated cargo containers in the EM contractor's yard by the subcontractor's personnel. EG&G personnel will dispose the contents of the cargo containers at the landfill. PPE suspected of containing radioactive and/or hazardous substances will be bagged, sealed, labeled, and placed in a cargo container in the contractor's yard specifically designated for potentially contaminated disposable PPE. A representative sample from bags containing potentially contaminated PPE will be obtained by the subcontractor for further characterization (see SOP FO.20, Sampling of Personal Protective Equipment for Contaminant Characterization)..

Radiological Engineering-approved contractor Environmental Health and Safety Specialists are responsible for conducting organic vapor and radiation screenings of equipment, samples, PPE, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, movement, storage, treatment, and disposal of solid environmental materials from the cargo containers in the contractor's yard.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Rockwell International. Policies: Rocky Flats Plant, Use and Color Coding of Drums. RFPM MAT 20-005. November 3, 1989.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.2, Field Document Control
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors

(FIDs)

- SOP FO.16, Field Radiological Measurements
- SOP FO.20, Sampling of Personal Protective Equipment For Contaminant Characterization

5.0 EQUIPMENT

The following items are required for handling disposable PPE.

- Large plastic garbage bags
- Duct tape
- Water-proof marking pens for labeling plastic bags

6.0 PROCEDURES FOR HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations that have not been verified as background locations

Other potentially contaminated work areas where groundwater plumes have been identified will be specified in the applicable work plans, as appropriate. SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers, lists the IHSS work areas at RFP and illustrates the identified groundwater plume areas and the americium area at OU No. 2. It also lists the surface water and sediment stations that have been verified as background stations as of December 1990. Other surface and sediment sampling stations will be added to this list as they become verified as background stations. Unless specified in the individual project work plans, all other work areas will be considered potentially contaminated.

Field monitoring, including organic vapor detectors (OVDs) and radiation monitors, will be used during all intrusive activities regardless of the work area characterization. PPE generated during EM field operations will be handled depending on the results of the field monitoring. Disposable PPE worn in work areas that are characterized as potentially contaminated will be screened by Radiological Engineering-approved contractor Environmental Health and Safety Specialists to determine if the PPE is potentially contaminated. Disposable PPE worn in not potentially contaminated work areas but where a positive reading was detected on a field monitor will also be screened to determine if the PPE is potentially contaminated. The use of field monitors for the detection of volatile organics and low-level radioactively contaminated substances is discussed in SOP FO.15, Use of Photoionization Detectors and Flame Ionization Detectors; and SOP FO.16, Field Radiological Instruments.

The subcontractor's site manager is responsible for implementing disposable PPE management procedures established by this SOP and procedures referenced in this SOP.

These duties include:

- Consulting with the EG&G EM project manager to resolve any questions concerning the characterization of a work area

- Properly using field monitors during EM activities

- Placing bags containing not potentially contaminated PPE (i.e. PPE worn in not potentially contaminated work areas where no verified positive field monitor readings were encountered or, PPE that has been screened by a Radiological Engineering-approved Health and Safety Specialist and found to be not potentially contaminated) in designated cargo containers in the EM contractor's yard.

- Ensuring that plastic bags containing potentially contaminated PPE (i.e. PPE that has been screened by Radiological Engineering-approved Health and Safety Specialists and a verified positive field monitor reading was encountered during the screening process) is placed in the appropriate cargo container in the EM contractor's yard. Potentially contaminated PPE will not be commingled with not potentially contaminated PPE.

6.1 PERSONAL PROTECTIVE EQUIPMENT

PPE is generally defined as clothing or equipment required to be worn by the site-specific Health and Safety Plan (HSP) in order to limit worker's exposure to physical, chemical or radiological health hazards. Any questions regarding whether a given item is considered to be PPE for the purposes of disposal should be directed to the site safety officer.

All disposable PPE worn in a work area characterized as potentially contaminated will be screened by a Radiological Engineering-approved contractor Health and Safety Specialist. In not potentially contaminated work areas where a positive reading was detected on either the OVD or the field radiation monitor, PPE will also be screened. Potentially contaminated PPE is any PPE where a verified positive reading was encountered during the screening process.

If no verified positive reading was encountered during the screening process, disposable PPE will be considered not potentially contaminated. In not potentially contaminated work areas where no positive reading was detected on the field monitors, PPE will be considered not potentially contaminated.

In general, the site-specific HSP will describe the PPE to be worn, as well as methods of decontaminating disposable and reusable PPE, such as respirators. In general, garbage cans with plastic liners are prescribed for use in the personal decontamination line to contain discarded PPE. This SOP provides procedures for handling and disposing of disposable PPE.

6.2 HANDLING OF POTENTIALLY CONTAMINATED PPE

Disposable PPE will be considered potentially contaminated if the screening process conducted by Radiological Engineering-approved contractor Health and Safety Specialists indicates that the PPE may be potentially contaminated (i.e. a verified positive reading is detected on either the OVD or the field radiation monitor). Workers will establish a personal decontamination line in accordance with the site-specific HSP and will place their PPE in containers lined with plastic bags while going through the decontamination line.

The following procedures will be used to handle potentially contaminated PPE from containers used in a personal decontamination line.

- If respiratory protection was required during the field activity, the last person through the decontamination line will continue to wear the respiratory protection until removal is indicated in these procedures.

- The last person will process through the decontamination line just as the preceding workers.

- After all PPE items have been removed and placed in the plastic bags, the plastic bags can be processed.

- The last worker will don a fresh pair of gloves before handling the plastic bags containing PPE at the last decontamination station. A representative sample will be taken of the potentially contaminated PPE as described in SOP FO.20, Sampling of Personal Protective Equipment for Contaminant Characterization. The plastic bags containing the discarded potentially contaminated PPE will then be removed from the container, the bags will be compressed in a downwind direction, and the compressed bags will be sealed with duct tape.

- While still wearing the respirator and the fresh pair of gloves, the worker will remove the sealed plastic bags containing PPE from the containers along the decontamination line.

- Where possible, the individual bags of PPE will be combined in a single plastic bag, sealed with duct tape, and marked with a waterproof marker. If it is not possible to combine individual bags into a single bag, each individual bag will be sealed and marked.

- The respirator may be removed after all disposable, potentially contaminated PPE bags have been sealed. The respirator cartridges and gloves will also be removed and placed inside a plastic bag, sealed, and marked.

- Marking for plastic bags will include the characters "PPE"; the associated well, boring, or sampling number and location; and the date.

- The plastic bags will be placed in cargo containers designated for potentially contaminated PPE located at the EM contractor's yard until characterized.

- In no instance will an unmarked bag be placed in a cargo container.

6.3 HANDLING OF NOT POTENTIALLY CONTAMINATED PPE

PPE will be considered not potentially contaminated if the work area is characterized as not potentially contaminated and no verified positive reading was detected on either the OVD or the field radiation monitor during tasked activities. PPE that has been screening by a Radiological Engineering-approved contractor Health and Safety Specialist where no positive readings were encountered will also be considered not potentially contaminated.

not potentially contaminated, disposable PPE will normally be handled as ordinary refuse. Disposable PPE and uncontaminated miscellaneous solid environmental materials will be placed in garbage cans lined with plastic bags at the work area. When full, these plastic bags will be sealed and marked as described in Subsection 6.2.1. These bags will be placed in designated cargo containers located in the contractor's yard. The contents of these cargo containers will be disposed of in the landfill by EG&G personnel.

7.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Observations and data will be recorded on field log forms. Form FO.8A will be used to document organic vapor monitoring results and Sections I and II on Form FO.16A will be used to document field radiological results. It is important to annotate on the field log forms all of the sample locations and sample numbers of the activities for which the PPE was worn. Subcontracting personnel may also choose to document the observations and data in a personal field notebook in addition to the field log forms. If a field book is used, entries should be made with a black waterproof ink pen. The field notebook should be waterproofed and have consecutively numbered pages. All project files will be turned over to EG&G at this time (see SOP FO.2, Field Documentation).

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.8A

VERIFICATION OF ORGANIC VAPOR MONITORING RESULTS

1. Date: ______________________ Work Area: ____________________________________

2. Check Historical Characterization

   ___ Not potentially contaminated ___ RAD ___ Hazardous ___ Mixed

3. Prework/Background Organic Vapor Monitoring Results

   Instrument Used: ________________

   (numeric value): ________________ (units, i.e. ppm): ________________

4. Verification Measurements

   Initial measurement above background: ______________________________

   Background check: ______________________________

   First verification measurement: ______________________________

   Background check: ______________________________

   Second verification measurement: ______________________________

5. If either of the verification measurements are above the preceding background measurement the initial measurement has been verified.

Individual completing this form:____

Print Name Signature Date

Subcontractor:____

Results of Radiological Measurements In the Field

Project Location: ______________________ Date: __________

Project Number: ______________________

I. Work Area Monitoring

Site Number (i.e., bore site, well, sediment, etc.): ______________________

Snow cover present:(Y/N)__________

Work surface wet:(Y/N)__________

Instrument Used (Check appropriate line):

_____ Ludlum Model 12-1A alpha counter with an air proportional probe Serial No.__________

_____ Other (Specify manufacturer, model, serial number, and type probe):

Manufacturer:__________

Model: __________

Serial Number:__________

Type: __________

Calibration Date:__________

Prework Monitoring Results:

__________cpm at point of intrusive activity

__________highest measured cpm

Illustrate all measurement sites and results on the reverse side of this sheet.

______________________________________ / /

(Printed Name and Signature/Date)

(Subcontractor)__________________ (Phone)__________________

II. Environmental Materials Monitoring

_______ Environmental materials monitoring not required. Work area was characterized as uncontaminated and field radiological screening as work progressed did not indicate the presence of potential contamination.

Instrument Used (check appropriate line):

_______ Ludlum Model 12-1A alpha counter with an air proportional probe Serial No.________

_______ Other (Specify manufacturer, model, serial number and type probe):

Manufacturer:________________

Model: ________________

Serial Number:________________

Type: ________________

Calibration date:________________

_____________ (Y/N): PPE screening resulted in a verified positive reading

_____________ Background reading

_____________ PPE verified positive reading

Drums Monitored By A Ludlum Model 12-1A And Large Area Swipes at the Work Site:

Drum ID No.	Surface Smeared	Results (cpm)

____

(Printed Name and Signature) (Subcontractor) (Date)

HANDLING OF DECONTAMINATION WATER AND WASH WATER

EG&G ROCKY FLATS PLANT		**Manual:**	**5-21000-OPS**
EMD MANUAL OPERATION SOP		**Procedure No.:**	**FO.7, Rev. 1**
CONTROLLED DOCUMENT		**Page:**	**1 of 8**
		Effective Date:	**August 30, 1991**
Category 2 EG&G — ROCKY FLATS PLANT		**Organization:**	**Environmental Management**
~~ENVIRONMENTAL MANAGEMENT DEPARTMENT~~			

This is a RED Stamp

TITLE:
HANDLING OF DECONTAMINATION WATER AND WASH WATER

Approved By: J. W. Langman Jr. 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

(4011:REV)(FO7REV.1)(09/04/91)

"REVIEWED FOR CLASSIFICATION
By A. J. Kellan (?)
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used by subcontractors at Rocky Flats to handle decontamination water and wash water used during Environmental Management (EM) field activities.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for coordinating the removal and transfer of all solid environmental materials from the project work area.

The subcontractor is also responsible for moving environmental liquids to holding tanks located at the central EG&G decontamination facility.

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums must have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until relinquished to EG&G. These inspections will ensure that drum integrity is maintained.

Radiological Engineering-approved contractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave the work area.

EG&G's Waste Operations personnel are responsible for the collection, transport, and storage of solid environmental materials from the drum transfer area and environmental liquids at the main decontamination facility.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

EG&G. Use and Color Coding of Drums. Policies: Rocky Flats Plant. RFPM MAT 20-005. November 3, 1989.

Environmental Protection Agency (EPA). A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

RCRA Facility Investigation Guidance. Interim Final. May 1989.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.4, Heavy Equipment Decontamination

- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO.16, Field Radiological Measurements

5.0 EQUIPMENT

The minimum equipment needed to handle decontamination water or wash water are the following:

- Truck or trailer with enclosed sides for moving liquid waste containers
- Personal splash protection equipment
- Pump (hand or peristalic)
- Gray drums or other liquid waste containers
- Drum handling equipment (if drums are used)

6.0 WORK AREA CHARACTERIZATIONS

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and <u>not</u> potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations which have not been verified as background locations

See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers for specific work areas currently characterized as potentially contaminated.

The types of contamination that may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

6.1 HANDLING OF DECONTAMINATION WATER AND WASH WATER

Decontamination water is soapy or clear water used for cleaning and rinsing equipment, personnel, samples, or vehicles used in work areas characterized as potentially contaminated or in not potentially contaminated work areas, where verified positive detections above background were encountered during field monitoring. The water used to clean equipment used during drilling activities, regardless of the work area characterization, will be considered decontamination water.

Wash water is soapy or clear water used to clean equipment, personnel, samples, or vehicles used at work areas characterized as not potentially contaminated where no verified positive readings above background were detected during field monitoring.

If a work area is characterized as not potentially contaminated but verified results from field monitoring indicate the presence of previously unsuspected contaminated substances, the water used for cleaning equipment, personnel, samples, and vehicles is considered decontamination water.

6.1.1 Handling of Decontamination Water

Decontamination water will be contained by the subcontractor in gray 55-gallon drums or liquid containers. The drums will be taken by the subcontractor to the main EG&G decontamination facility. The decontamination facility will have an area specifically designed for environmental liquids disposal (see SOP FO.12, Decontamination Facility Operations for details pertaining to the environmental liquids area). The subcontractor will empty the entire drum's contents into this area.

Other considerations to ensure the proper handling of decontamination water are:

- Due to high phosphate levels, Alconox will not be used. Liquinox or a phosphate-free equivalent will be used.

- Decontamination water used by subcontracting personnel must be replaced at least once daily regardless of the contamination level. Replacement may be required more than once a day, depending on field conditions (i.e., heavy mud or organic or radioactive contaminants).

- Use gray, 55-gallon, open top (removable top) drums or environmental liquids containers appropriately sized for the task to move decontamination water.

- Liquid container lids will be secured and containers will be moved in trucks with enclosed sides.

- Mark the liquid containers used for moving environmental liquids with the words "NONPOTABLE PENDING ANALYSIS" as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

- Document the use of gray drums for moving environmental liquids on the Drum Field Log Form (Form FO.10A, see Section 8.0 - Documentation.)

- Decontaminate containers used to move environmental liquids after emptying them. (See SOP FO.3, General Equipment Decontamination.)

- No containers with holes, leaks, or bad seals will be used for moving decontamination water.

- Proper "splash" protection must be used while handling fluids (see SOP FO.4, Heavy Equipment Decontamination.)

6.1.2 Handling of Wash Water

For surface water field activities in areas characterized as background stations (uncontaminated) (see SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers), wash water and rinse water will be disposed of on the ground at least 50 feet from the sampling location such that the waste water cannot discharge into any stream, pond, or other surface water impoundment.

Wash water used to clean equipment, personnel, or vehicles during surface soil sampling or groundwater sampling in work areas characterized as not potentially contaminated where no verified positive reading were detected on field monitors will be disposed of approximately 50 feet from the sampling location. The disposal location must be at least 200 feet from any stream drainage.

7.0 DECONTAMINATION

Decontamination of equipment used to handle and move decontamination water will be done in accordance with SOP FO.4, Heavy Equipment Decontamination and SOP FO.3, General Equipment Decontamination, and will be done between work areas so as not to promote cross-contamination of work areas. Equipment and containers used for handling wash water will be power sprayed and rinsed.

8.0 DOCUMENTATION

8.1 DRUM FIELD LOG FORM

If gray drums are used for moving environmental liquids, a Drum Field Log Form (Form FO.10A) will be filled out in order to maintain a "cradle to grave" record. Information on the Field Drum Log Form includes:

- Drum ID number
- Date of issue
- Location in field
- Contents
- Fill date
- Date of decontamination and area location
- Date returned to EG&G

Any damage incurred to a drum either during shipping or handling will be reported to an EG&G representative as soon as possible for immediate correction.

Entries made on the Drum Field Log Form may be supported with entries in a field logbook.

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

DRUM FIELD LOG FORM

FORM FO.10A

NAME OF THE SUBCONTRACTOR .... ____________

DRUM ID NUMBER WITH SUBCONTRACTOR'S ID............. ____________

LOCATION AND DATE OF ISSUANCE .... LOC ____________ DATE ____________

NAME AND LOCATION OF FIELD ACTIVITY .... NAME ____________ LOC ____________

ASSOCIATED WELL, BORING, OR SAMPLING
LOCATION .... NAME ____________ ____________

CONTENTS OF DRUM .... ____________

SUBSURFACE INTERVALS (IF SOILS) .... ____________ ____________

BAG #S (IF PPE)

ASSOCIATED SAMPLE ID #S ....

DATE DRUM WAS FILLED .... ____________

SIGNATURE OF PERSON FILLING THE DRUM .... ____________

IF SOLID ENVIRONMENTAL MATERIALS

LOCATION OF TEMPORARY STORAGE AREA .... ____________

DATE DRUM RETURNED TO EG&G .... ____________

SIGNATURE OF EG&G REPRESENTATIVE .... ____________

IF ENVIRONMENTAL LIQUIDS

DATE AND LOCATION WHERE CONTENTS WERE
EMPTIED AND DECONNED .... DATE ____________ LOC ____________

(EXAMPLE: 2/18/91 DECON PAD #____)

(4011-REV)(FORMFO10AB.WK1)(07/25/91)

ENVIRONMENTAL MANAGEMENT

DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS-FO.8, Rev. 1

Title	Date	DCN Number
Handling of Drilling Fluids and Cuttings	9/19/91	5-21000-OPS-FO.8 91.01

Expires Upon incorporation   Procedure Revision Required ☒ Yes ☐ No

Scope Limitation:

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for additional space)
1	10 of 12	6.4.1	Delete the word "locked" from the sentence that reads, "After filling, these gray drums will be sealed, ~~locked,~~ marked, and placed on a pallet at the drilling site."

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

Justification (Reason for change - Provide numbers to reference corresponding items above.)

Locking is not required in an area where RFP security monitors activities.

Concurrence	Organization	Req.	Date	Concurrence	Organization	Req.	Date
[signature]	QAPM	X	9/19/91		User		

Approval of Responsible manager	Date	Is Posting required?	If Yes, by what date	Date posted
[signature]	9/19/91	☒ Yes ☐ No		

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) will be used at the Rocky Flats Plant (RFP) to describe the proper methods to control, contain, and handle drilling fluids and cuttings.

This SOP describes the handling of drill cuttings and drilling fluids and the use of organic vapor detectors (OVDs) and radiological screening for field monitoring.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for the proper handling of all materials generated during drilling activities.

The subcontractor is responsible for drumming drill cuttings. Drums containing drill cuttings will be transferred to the custody of EG&G Waste Operations only after the drums' contents have been characterized and the drums have passed inspection. Characterization will be based on analytical results of the samples corresponding to the cuttings associated with the drums' contents and the EG&G Hazardous Waste Requirements Manual (HWRM).

The subcontractor is also responsible for moving environmental liquids associated with EM drilling activities to holding tanks located at the main EG&G decontamination facility.

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum

EG&G ROCKY FLATS PLANT		Manual:	5-21200-OPS
EMD MANUAL: ~~OPERATION SOP~~		Procedure No.:	FO.8, Rev. 1
		Page:	1 of 12
		Effective Date:	August 30, 1991
Category 2		Organization:	Environmental Management

TITLE:
HANDLING OF DRILLING FLUIDS AND CUTTINGS

Approved By:

J. W. Langman 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

integrity. Damaged drums will have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until the drums are relinquished to the custody of EG&G Waste Operations. These inspections will ensure that drum integrity is maintained.

Radiological Engineering-approved contractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, transport, and storage, of solid environmental materials from the drum transfer area and environmental liquids from the decontamination facility.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

EG&G. Hazardous Waste Requirements Manual (HWRM). June 1991.

EG&G. On-Site Transportation Manual. 1991.

EG&G. Policies: Rocky Flats Plant, Use and Color Coding of Drums. RFPM MAT 20-005. November 3, 1989.

Environmental Protection Agency (EPA). A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Hall, Ridgway M. Jr., Tom Watson, Jeffrey J. Davidson, David R. Case, Nancy S. Bryson. RCRA Hazardous Wastes Handbook. 6th Edition. Government Institutes, Inc. Rockville, MD. March 1986.

National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and U.S. Environmental Protection Agency (EPA). Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. October 1985.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.4, Heavy Equipment Decontamination
- SOP FO.5, Handling of Purge and Development Water
- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.9, Handling of Residual Core and Laboratory Samples
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors
- SOP FO.16, Field Radiological Measurements
- SOP GT.2, Drilling and Sampling Using Hollow-Stem Auger Techniques

5.0 EQUIPMENT

The following items will be required during most field operations that generate drilling fluids and cuttings:

- Gray, 55-gallon drums, Type 17C
- Rigid liner for drums
- Shovels and scoops with nonporous surfaces to facilitate decontamination
- Paint stick for marking drums
- Organic vapor detector (OVD)
- Field radiation monitor
- Drum bung wrench
- Tools for opening and sealing open-top 55-gallon drums with a clamp-type sealing band
- Pallets
- Opaque weather-proof sheeting
- Hand pressurized sprayer
- Desiccant
- If drilling muds are used, a seamless container (such as a molded plastic type) will be used for decanting fluids from residual sediments
- Personal Protective Equipment (PPE) as specified in the Site-Specific Health and Safety Plan
- A heavy equipment forklift or truck equipped with a drum grappler and capable of lifting a 55-gallon drum containing solid or liquid materials

6.0 CONTAMINANT CHARACTERIZATION

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations that have not been verified as background locations

A listing and locator map of all known Individual Hazardous Substance Sites (IHSS) has been included in Appendix FO.10A of SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

Drill cuttings generated during EM field operations will be handled by containerizing them in 55-gallon gray drums as they are generated. Environmental liquids generated during EM field operations will be containerized in 55-gallon, gray, closed top drums or appropriately sized containers. The liquid containers will be moved to the environmental liquids area at the main decontamination facility.

The use of field monitors for the detection of volatile organics and radionuclides is discussed in SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors; and SOP FO.16, Field

Radiological Measurements and their use is defined in the Health and Safety Plan (HSP).

The types of contamination that may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

6.1 PREDRILLING PROCEDURES

Predrilling procedures will be conducted prior to drilling a well or boring regardless of the work area characterization. Predrilling procedures include the following:

- Subcontracting personnel will conduct a radiological screening (see SOP FO.16, Field Radiological Measurements) of the ground surface prior to any drilling activity.

- The surface soil around the staked boring or well location will be wetted with distilled water from a hand-pressurized spray bottle. The wetting will be sufficient to preclude dust generation during the soil removal process.

- The subcontractor personnel will use a shovel to remove a depth of approximately 20 cm of soil from an arc of sufficient size to allow for approximately 2 inches of clearance on each side of the auger. The wet soil will be spread over the ground near the drilling site. Drilling activities may now begin. The shovel will be decontaminated between work areas.

6.2 DRILLING PROCEDURES

The auger will be positioned approximately in the center of the 20-cm-deep excavation to begin drilling. As cuttings are generated, they will be wetted with distilled water from a hand-pressurized sprayer and placed on the ground.

An OVD and a field radiation monitor will be used to screen core or cuttings to determine if hazardous or radioactive substances are present so that the proper PPE is selected in order to comply with the HSP. In work areas requiring a radiological work permit and an Integrated Work Control Form with an appropriate work package, a Radiological Engineering-approved contractor Health and Safety Specialist will be contacted to radiologically monitor the equipment and PPE at the end of each day's drilling activities. The equipment and PPE will be handled per SOP FO.4, Heavy Equipment Decontamination and SOP FO.6, Handling of Personal Protective Equipment.

6.3 FIELD MONITORING

OVD and field radiological screenings will be conducted by the subcontractor within each work area for all intrusive activities to ensure the safety and to determine the proper PPE to be worn by all workers. The OVD and field radiological monitors will be used as described in SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors, and FO.16, Field Radiological Measurements. For the purposes of this SOP, the following procedures apply:

- Prior to the start of work, measure the organic vapor and radioactive background level on the upwind side of the activity area. Record the results on Form FO.8A, Verification of Organic Vapor Monitoring, Form FO.16A, Results of Radiological Monitoring in the Field, and in the logbook.

- Monitor the borehole for organic vapors and radiological contaminants where the intrusive work is occurring. The results of monitoring shall be recorded as described in the site-specific HSP. When hollow-stem augers are being used, monitor inside the auger each time the drive head is removed. When solid-stem augers are being used, monitor the cuttings at ground level each time the auger is stopped.

- Single OVD or field radiological measurements greater than the background measurement may indicate the presence of hazardous or radioactive substances and must be verified as described in Subsection 6.3.1.

- When an OVD or field radiological measurement above background is detected, all intrusive work will stop until the verification procedures are complete.

6.3.1 Verified Positive Readings

The following verification procedures will be used after detecting an initial OVD or radiological measurement greater than the background measurement. The verification process will be recorded on Form FO.8A, Verification of Organic Vapor Monitoring Results, and Form FO.16A, Results of Radiological Monitoring in the Field.

- For an OVD reading above background, turn off any diesel- or gasoline-driven engines operating within the vicinity of the work area since most OVDs will detect incomplete combustion by-products.

- Remove the instrument (OVD or field radiological) from the work area and make an upwind measurement of ambient organic vapor levels or radioactivity, as appropriate.

- That measurement will be followed by a remeasurement at the same location where the positive measurement was recorded.

- If the remeasurement is not above background, repeat the preceding actions for a third measurement and record the results.

- If any two of the three measurements (including the original measurement) indicate organic vapor levels or radioactivity greater than the background level, the original measurement has been verified.

6.4 INVESTIGATIVE MATERIALS

6.4.1 Handling Drill Cuttings

Drill cuttings will be contained in gray drums with a liner (See SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers, Section 6.3.2) regardless of the work area characterization. Prior to the filling of the drum, two liters of desiccant will be placed in the bottom of the drum and two additional liters will be put into the drum when the drum has been filled half full. Cuttings will be placed in the drum until the drum is full. After filling, these gray drums will be sealed, locked, marked, and placed on a pallet at the drilling site. After the laboratory analytical results of the environmental samples have been received and assessed by EG&G, Waste Operations will proceed with the disposition of the drums. If the drum's contents are determined to be uncontaminated, the contents will be disposed of in the landfill. If the drum's contents are determined to contain hazardous substances, mixed substances, or radioactive substances, the drums will be painted the appropriate color corresponding to the characterization of the drum's contents, labeled appropriately (See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers), and stored by EG&G Waste Operations according to the proper SOPs contained in the HWRM and the On-Site Transportation Manual.

6.4.2 Handling Drilling Fluids

If drilling fluids are to be used, the entire pumping system will be checked for leaks before the pumping system is taken to the work area. Checking will consist of assembling the system and pumping potable quality water through it. If a leakage in the hose connections or elsewhere is detected, it will be repaired before being used.

If a drilling fluid system being used at a drill site develops a significant leak that will result in the potential contamination of the surficial soils, the system will be shut down and repaired within the work area, if feasible. If repairs are not feasible within the work area, the drill rig will be removed from the work area and decontaminated before it is repaired (see SOP FO.4, Heavy Equipment Decontamination).

Drilling fluids will be contained in 55-gallon, gray, closed top drums or appropriately sized containers. Field personnel should decant the environmental liquids from one drum (or container) to another (or from a trough to a drum or container) prior to moving if the amount of sediment within the environmental liquids is substantial. The residual sediments will be placed in gray drums according to Section 6.4.1 of this SOP. The environmental liquid containers will be moved to the environmental liquids area at the main decontamination facility. (See SOP FO.12, Decontamination Facility Operations for details pertaining to the environmental liquids area.) Environmental liquid containers will be marked and moved as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. The liquid containers will be emptied by the subcontractor into the decanting tanks at the decontamination facility.

7.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Form FO.8A, Verification of Organic Vapor Monitoring Results and Form

FO.8B, Record of Drilling Fluids and Cuttings are provided to assist in the documentation of the field monitoring. Results of the field radiological monitoring will be documented in accordance with SOP FO.16, Field Radiological Measurements.

Additionally, drums issued to a subcontractor by EG&G will have an associated Drum Field Log Form (FO.10A) and a Contaminant Characterization Form (FO.10C) as discussed in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

VERIFICATION OF ORGANIC VAPOR MONITORING RESULTS

1. Date: ______________________ Work Area: ____________________________________

2. Check Historical Characterization

   ___ Not potentially contaminated ___ RAD ___ Hazardous ___ Mixed

3. Prework/Background Organic Vapor Monitoring Results

   Instrument Used: ________________

   (numeric value): ________________ (units, i.e. ppm): ________________

4. Verification Measurements

   Initial measurement above background: ______________________________

   Background check: ______________________________

   First verification measurement: ______________________________

   Background check: ______________________________

   Second verification measurement: ______________________________

5. If either of the verification measurements are above the preceding background measurement the initial measurement has been verified.

Individual completing this form: ____

Print Name Signature Date

Subcontractor: ______________________________________

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT **FORM FO.8B**

RECORD OF DRILLING FLUIDS AND CUTTINGS

Date of Activities ____________________ Field Team Leader____________________

1. Personnel Assigned to task that generated the environmental materials

Name	Assignment	Employer
____________________	Driller	____________________
____________________	Driller's Helper	____________________
____________________	Geologist	____________________
____________________	Health and Safety Tech	____________________
____________________	Other - Specify	____________________

2. Identification of site task was accomplished at: ____________________

____

____

3. Contaminant classes assumed to be present (check as appropriate).

_______ low-level RAD substances _______ RCRA regulated substances _______ Uncontaminated Area
_______ high-level RAD substances _______ Mixed substances

4. Unanticipated contaminant classes found.

_______ No _______ Yes (check as appropriate)

_______ low-level RAD substances _______ RCRA regulated substances
_______ high-level RAD substances _______ Mixed substances

5. Highest environment monitoring results.

Organic vapors: ____________ (value) ________ (units) ____________

instrument used:____________________

Radioisotopes: ____________ (value) ________ (units) ____________

instrument used:____________________

Completed by: ____
Print Name Signature Date

Subcontractor____________________

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

DRUM FIELD LOG FORM

FORM FO.10A

NAME OF THE SUBCONTRACTOR .... ______________________

DRUM ID NUMBER WITH SUBCONTRACTOR'S ID............. ______________________

LOCATION AND DATE OF ISSUANCE .... LOC ______________ DATE ______________

NAME AND LOCATION OF FIELD ACTIVITY .... NAME ______________ LOC ______________

ASSOCIATED WELL, BORING, OR SAMPLING
LOCATION .... NAME ______________ ______________

CONTENTS OF DRUM .... ______________

SUBSURFACE INTERVALS (IF SOILS) .... ______________ ______________

BAG #S (IF PPE) ______________ ______________

ASSOCIATED SAMPLE ID #S .... ______________ ______________

DATE DRUM WAS FILLED .... ______________

SIGNATURE OF PERSON FILLING THE DRUM .... ______________

IF SOLID ENVIRONMENTAL MATERIALS

LOCATION OF TEMPORARY STORAGE AREA .... ______________

DATE DRUM RETURNED TO EG&G .... ______________

SIGNATURE OF EG&G REPRESENTATIVE .... ______________

IF ENVIRONMENTAL LIQUIDS

DATE AND LOCATION WHERE CONTENTS WERE
EMPTIED AND DECONNED .... DATE ______________ LOC ______________

(EXAMPLE: 2/18/91 DECON PAD #____)

(4011-REV)(FORMFO10AB.WK1)(07/25/91)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT FORM FO.10C

CONTAMINANT CHARACTERIZATION FORM
FOR GRAY DRUMS PENDING CHARACTERIZATION

ATTACH CHEMICAL RESULTS OF ASSOCIATED SAMPLES

THIS PORTION WILL BE COMPLETED BY SUBCONTRACTOR

Name of the Subcontractor Issued the Drum .... ____________________

The serialized Drum ID number with the
Subcontractor's ID .... ____________________

The Date the Drum Was Taken to a Field Activity .... ____________________

The Location of the Field Activity Area .... ____________________

The Contents of the Drum .... ____________________
(Subsurface Intervals, if Soils)
(Bag #s, if PPE)

____
____
____
____

The Date the Drum was Filled .... ____________________

The Associated Well, Boring, or Sample location .... ____________________

Matrix of Samples Analyzed .... ____________________

Sample ID #s .... ____________________
____
____
____
____

Intervals Samples were Taken From .... ____________________
____
____
____
____

Date Submitted to EG&G for Characterization .... ____________________

Subcontractor's Representative Signature .... ____________________

THIS PORTION WILL BE COMPLETED BY EG&G

The Contaminant Characterization of the Drum's Contents .... ____________________

Signature of EG&G Representative Determining the
Contaminant Characterization and Date Signed .... ____________________
Date ____________________

EG&G Holding Facility Where Drum Will be Stored .... ____________________

Date and Time Form Returned to Waste Operations .... Date ________ Time ________

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		Organization:	Environmental Management

Category 2

TITLE:
HANDLING OF RESIDUAL SAMPLES

Approved By: J.W. Langman Jr. 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the waste management procedures to be implemented at the Rocky Flats Plant (RFP) for the handling of residual laboratory soil samples, and the documentation necessary to be in compliance with the RFP Waste Management Program. This SOP is intended to be sufficiently detailed so that conformance will result in reliable handling of residual laboratory soil samples.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

3.1 SUBCONTRACTORS

The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for ensuring that the procedures are followed by all subcontractor personnel.

The assigned onsite sampling manager will have a minimum of a two year college science degree and report to an assigned chemist. The sampling manager will be responsible for all coordination and required documentation as specified in this SOP between the subcontractor, EG&G, and the laboratory.

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training or licensees.

3.2 LABORATORY

The laboratory will be responsible for contacting the subcontractor that originally submitted the samples prior to shipping any residual lab soil samples. The laboratory will also be required to provide all documentation, as specified in this SOP, to the subcontractor and ship all laboratory residual soil samples in accordance with all applicable Department of Transportation (DOT) regulations.

3.3 EG&G

The EG&G project manager has the overall responsibility for implementing this SOP. EG&G will be responsible for approving all Residual Lab Soil Characterization (RLSC) forms and final disposition of all residual laboratory soils.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

RCRA Facility Investigation Guidance. Interim Final. May 1989.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations

5.0 PROCEDURE FOR THE HANDLING OF RESIDUAL SAMPLES

Residual laboratory soil samples consist of excess soils collected at RFP that were not used by the chemical laboratory for analyses and are being returned to RFP.

The following procedures are guidelines to be followed by the subcontractor for the proper chemical characterization, movement, storage, and containment of residual laboratory soils being returned to RFP by EG&G's contracted chemical laboratories.

5.1 RECEIVING RESIDUAL LABORATORY SAMPLES

Chemical laboratories requesting to return residual soil samples will first contact the subcontractor that originally submitted the soil samples to the laboratory. The subcontractor will require all documentation specified in this SOP. The laboratory will provide the subcontractor with the following notification of shipment:

- Sample identification list of residual soils to be returned to RFP
- Method of shipment (i.e., courier)
- Expected date and time of delivery
- Number of shipping containers
- Total number of individual sample containers

5.2 CHARACTERIZING RESIDUAL LABORATORY SAMPLES

Once the subcontractor receives all required information from the laboratory, the subcontractor will access the Rocky Flats Data Management System (RFDMS) for the validated chemical results of the associated soil sample. The subcontractor will categorize each soil as radioactive, hazardous (nonradioactive RCRA-regulated hazardous substances), or non-hazardous based upon the chemical results. The chemical categorization will be performed by the subcontractor's assigned sample manager and chemist. All chemical categorizations performed by subcontracting personnel will be based on validated chemical results of the associated soil sample obtained during field sampling activities.

Following the subcontractor's chemical categorization of each residual soil sample to be returned to EG&G, the subcontractor will complete a Residual Lab Soil Characterization (RLSC) Form (Form FO.9A). This form will identify the name of the subcontractor, the chemical laboratory requesting the return shipment, the date of request, and the RLSC identification (I.D.) number (sample I.D.). Included on this form will be the subcontractor's chemical categorization of each soil sample which will be identified as follows:

- Uncontaminated
- Low-level radioactivity contaminated (RAD)
- Nonradioactive RCRA-regulated hazardous (hazardous)
- Mixed (RAD and hazardous)

The subcontractor will also cross-reference the original Chain-of-Custody (COC) number to the residual soil sample and record that COC number on the spaces provided on the RLSC Form.

The RLSC form(s) and associated chemical results will be submitted to EG&G for final characterization and approval of acceptance of the residual laboratory soil samples. Following EG&G's waste characterization and approval, the RLSC Form and associated chemical analyses will be returned to the subcontractor. The subcontractor will authorize the chemical laboratory to proceed with the return shipment of the designated residual laboratory soils to RFP.

5.3 RECEIVING SAMPLE SHIPMENTS

The laboratory will address the residual laboratory soils to the subcontractor at RFP. The samples will be shipped in accordance with all applicable DOT shipping regulations. The laboratory will also provide duplicate copies of the associated COC form(s) pertaining the residual laboratory soils. The duplicate copies of the COC forms are to be securely placed on the outside of the shipping container(s) and well protected from the weather.

When the designated residual soil samples are received by EG&G's Shipping and Receiving Department, the subcontractor will be notified of the shipment. The subcontractor will move the unopened sample container(s) (coolers or packages) to the main decontamination facility. At the main decontamination facility, the subcontractor will open the sample cooler(s) in accordance with the Environmental Management's Project Health and Safety Plan. The subcontractor will inspect the contents in each sample container, assess damage, and ensure that all individual sample containers are listed on the accompanied COC form.

Samples identified on the COC by the subcontractor that cannot be accounted for will be lined-out, dated, and initialed on both COC copies. This discrepancy will be documented on the COC forms and the laboratory will be notified.

If containers are inventoried by the subcontractor during inspection and are not listed on the COC forms, the subcontractor will separate the non-listed sample container(s) and contact the laboratory and EG&G for further guidance.

If a sample container is found to be broken, the sample manager will check the EG&G characterization of the contents of the container. If the contents are characterized as uncontaminated, the sample will be left in the shipment container. If the soils within the broken sample container are characterized as RAD, hazardous, or mixed, the sample manager will contact the EG&G project manager for further guidance.

If the sample containers are undamaged, the subcontractor will segregate each sample container based on the EG&G characterization of the sample. Sample containers having the same characterization will be repackaged together. Each new package will be labeled according to the characterization of samples. Packages containing samples characterized as RAD will be labeled with a "White I" radioactive label. Packages containing samples characterized as hazardous or mixed will be labeled with a Department of Transportation (DOT) "Other Regulated Materials Class E" (ORM-E) sticker. Additionally, packages containing mixed residual samples will be marked with the word "RAD." (See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers for details pertaining to the proper handling of waste containers.)

The subcontractor will then place the repackaged samples at the drum transfer area at the main decontamination facility (see SOP FO.12, Decontamination Facility Operations). The subcontractor will have EG&G's Waste Operations personnel sign both copies of the COC forms. Custody of the residual soil samples is now considered officially transferred to EG&G.

The subcontractor will relinquish one copy of the COC form(s) to EG&G's Waste Operations personnel. The subcontractor will retain the duplicate COC form(s) to complete the subcontractor's document package that will ensure that residual soils were appropriately handled and returned to RFP.

5.4 DOCUMENT PACKAGE

The subcontractors's document package for residual laboratory samples returned to EG&G's custody will contain the following information for each shipment:

- An EG&G signed copy of the COC form(s)
- A copy of the completed RLSC form(s) and associated chemical analyses
- Laboratory notification of shipment

These document packages are to be filed in the subcontractor's project QA files and kept until requested by EG&G for permanent storage.

6.0 DOCUMENTATION

Information requested by this SOP will be documented on the RLSC (Form FO.9A) form(s) and the COC(s).

RESIDUAL LAB SOIL CHARACTERIZATION FORM
(RLSC)

ATTACH CHEMICAL RESULTS OF ASSOCIATED SAMPLES

THIS PORTION WILL BE COMPLETED BY THE SUBCONTRACTOR AND APPROVED BY EG&G

Name of Subcontractor . . . . ____________________

Name of Chemical Laboratory . . . . ____________________

Date of Request . . . . ____________________

Are Associated Chemical Results Attached? (Y/N) . . . . ____________________

Subcontractor's Signature . . . . ____________________
Date . . . . ____________________
Comments: ____

EG&G Project Manager . . . . ____________________
Residual Lab Soil Characterization

Sample I.D.	Original COC #	Characterization

Comments: ____

EG&G Approval Signature . . . . ____________________
Date . . . . ____________________

ENVIRONMENTAL MANAGEMENT

DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS- FO.10

Title	Date	DCN Number
Receiving, Labeling, and Handling Environmental Materials Containers	9/26/91	5-21000-OPS-FO.10 91.01

Expires Upon incorporation Procedure Revision Required ☒ Yes ☐ No

Scope Limitation:

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for additional space)
~~Manual 5-21000-OPS~~ FO.10 Rev 1	16	3	Omit (or indelible marker) and change should to will, (See attached)

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

Justification (Reason for change - Provide numbers to reference corresponding items above.)

U.V. Light breaks down the indelible marker and results in fading or lost ability to properly i.d. the label.

Concurrence	Organization	Req.	Date	Concurrence	Organization	Req.	Date
Barry McInnis	QAPM	X	9/26/91		User		

Approval of Responsible manager	Date	Is Posting required?	If Yes, by what date	Date posted
M.C. Broussard	9-26-91	☒ Yes ☐ No	9-26-91	

RECEIVING, LABELING, AND HANDLING ENVIRONMENTAL MATERIALS CONTAINERS

EG&G ROCKY FLATS PLANT	Manual:	5-21200-OPS
EMAD MANUAL OPERATION SOP	Procedure No.:	FO.10, Rev. 1
	Page:	16 of 21
	Effective Date:	June 10, 1991
Category 2	Organization:	Environmental Management

location will be sent to an off site laboratory for a full suite of analytical results to characterize these environmental materials. The drums will remain at the drilling site until a Waste Operations storage area is available. At the time Waste Operations notifies EM that space is available, the drums will be moved to the transfer/storage area to await assessment of the associated environmental samples.

The subcontractor will perform the following steps to ensure the proper handling of the gray drums until transferred to EG&G custody:

- In addition to the drum number, the drums will be marked with the words "ENVIRONMENTAL MATERIAL PENDING ASSESSMENT"; the associated well, boring, or sampling number and location; the word "SOIL", or "PPE" (for disposable personnel protective equipment), as appropriate; the subsurface interval (if soil); and the date the drum was filled. (Soils will not be commingled with miscellaneous environmental materials or PPE within a drum.)

- A paint stick ~~(or indelible marker)~~ ~~should~~ be used to apply identifying marks on drums to ensure that the marks will not be washed away during decontamination or precipitation. A paint stick should not be applied in the vicinity of sampling or field monitoring events to prevent cross-contamination of samples.

- Identifying marks should be legible, with characters approximately ~~5~~ inches high, and written on two (opposite) sides and on the top of the drum.

- Gray drums will be placed on wood pallets at the drilling site.

RECEIVING, LABELING, AND HANDLING ENVIRONMENTAL MATERIALS CONTAINERS

EG&G ROCKY FLATS PLANT	Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP	Procedure No.:	FO.10, Rev. 1
CONTROLLED DOCUMENT	Page:	1 of 20
	Effective Date:	August 30, 1991
Category: EG&G — ROCKY FLATS PLANT ENVIRONMENTAL MANAGEMENT DEPARTMENT	Organization:	Environmental Management

This is a RED Stamp

TITLE:
RECEIVING, LABELING, AND HANDLING ENVIRONMENTAL MATERIALS CONTAINERS

Approved By:

J. W. Langman Jr. 9/10/91

(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

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2.0 PURPOSE AND SCOPE

The environmental materials generated from Environmental Management (EM) field activities will be handled in accordance with the Rocky Flats Plant (RFP) waste management program. This standard operating procedure (SOP) describes procedures that will be used by subcontractors at RFP to receive, mark, and handle environmental drums until they are returned to RFP's representative, EG&G.

These procedures are intended to be sufficiently detailed so that conformance with them will result in reliable drum handling and management.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for the proper handling of all materials generated during drilling activities.

The subcontractor is responsible for drumming drill cuttings and other solid materials associated with environmental activities. The transfer of drums to the custody of EG&G Waste Operations personnel shall occur once the drum's contents have been characterized, the drum has been inspected, and space is available at the Waste Operations transfer/storage area.

The subcontractor is also responsible for moving environmental liquids associated with EM drilling activities to holding tanks located at the main EG&G decontamination facility.

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums will have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of the drums issued to the subcontractor until relinquished to the custody of EG&G. These inspections will ensure that drum integrity is maintained.

Radiological Engineering-approved contractor Environmental Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, transport, storage, treatment, and disposal of solid and liquid environmental materials from the drum transfer area at the main decontamination facility.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

Hazardous Waste Requirements Manual (HWRM). EG&G. June 1991.

On-site Transportation Manual. EG&G. 1991

Policies: Rocky Flats Plant, Use and Color Coding of Drums. EGJ&G. RFPM MAT 20-005. November 3, 1989.

A Compendium of Superfund Field Operations Methods. Environmental Protection Agency (EPA). EPA/540/P-87/001. December 1987.

Hall, Ridgway M. Jr., Tom Watson, Jeffrey J. Davidson, David R. Case, Nancy S. Bryson. RCRA Hazardous Wastes Handbook. 6th Edition. Government Institutes, Inc. Rockville, MD. March 1986.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and U.S. Environmental Protection Agency (EPA). October 1985.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.5, Handling of Purge and Development Water
- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.9, Handling of Residual Samples
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO.16, Field Radiological Measurements

5.0 EQUIPMENT

Several types of equipment can be used to move drums too heavy to lift safely. A list of appropriate equipment includes:

- A drum grappler attached to a hydraulic excavator
- A small front-end loader, which can be either loaded manually or equipped with a bucket sling
- A rough terrain forklift
- A roller conveyor equipped with solid rollers
- Drum carts designed specifically for drum handling
- Miscellaneous sizes of wrenches, sockets, and socket ratchets for opening and sealing drums
- Wood pallets
- Plastic or nylon banding

The drum grappler is the preferred equipment for handling heavy drums (NIOSH, et al., 1985).

6.0 WORK AREA CHARACTERIZATIONS

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Environmental Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and <u>not</u> potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface water and sediment sampling stations that have not been verified as background locations

Potentially contaminated work areas where groundwater plumes have been identified will be specified in the applicable work plans, as appropriate. Table FO.10-A1 of Appendix FO.10A lists the IHSS work areas at RFP. Figure FO.10-A1, of Appendix A, shows the locations of the RFP IHSSs. Figure FO.10-1 illustrates the identified groundwater plume areas and the americium area at OU No. 2. Table FO.10-1 lists the surface water and sediment stations (locations) that have been verified as background stations (uncontaminated) as of December, 1990. Other surface and sediment sampling stations will be added to this list as they become verified as background stations. Unless specified in the individual project work plans, all other work areas will be considered potentially contaminated.

Various types of environmental materials are generated during EM field operations. Solid environmental materials for the purpose of EM waste management at the RFP include drill cuttings, sludge, surface soils, and disposable personal protective equipment (PPE). Environmental liquids generated during field activities include drilling fluids, decontamination and wash water, and residual groundwater and surface water samples.

The types of contamination that may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

The use of field monitors for the detection of volatile organics and radionuclides is discussed in SOPs FO.8, Handling of Drilling Fluids and Cuttings; FO.15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs); and FO.16, Field Radiological Measurements.

Environmental materials generated within work areas characterized as <u>not</u> potentially contaminated and where no verified positive readings were detected on field monitors will be considered uncontaminated and handled as described in the following SOPs:

- SOP FO.5, Handling of Purge and Development Water
- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.9, Handling of Residual Samples

TABLE FO.10-1

BACKGROUND SURFACE WATER AND SEDIMENT STATIONS

FOR

ROCKY FLATS PLANT

Surface Water Station Number	Sediment Station Number	Location
SW004	SED 22	Rock Creek Drainage
SW005	SED 20	Rock Creek Drainage
SW006	SED 23	Rock Creek Drainage
SW108	SED 21	Rock Creek Valley Wall
SW007	SED 04	Tributary of Walnut Creek
SW041	SED 17	Tributary of Woman Creek
SW080	SED 18	Tributary of Woman Creek (spring)
SW104	SED 19	Tributary of Woman Creek (spring)
SW107	SED 16	Woman Creek Drainage
SW042	SED 15	Offsite Gravel Pits

Draft Background Geochemical Characterization Report
Rocky Flats Plant, Golden, Colorado
rockwell\bkgdchem\sed-3a.jbb

7.0 DRUM RECEIVING, LABELING, AND HANDLING PROCEDURES

7.1 RECEIVING

Environmental drums can be obtained by contacting the EG&G project manager. The amount and type of drums required to perform the work should be specified by the subcontractor. The EG&G project manager will direct the subcontractor to the appropriate drum distribution area. An advance notice of two days is preferred.

7.1.1 Drum Color Codes

EG&G has segregated drums into a color coding scheme for identification to ensure the proper management of waste (RFPM MAT 20-005). The color code identifies the suspected contaminant characterization of the materials within the drums. The color scheme has been modified to specifically address EM operations. EM drums are gray and contain only environmental materials pending analysis and characterization. The types of EM drums are as follows:

- Gray Drums
  1. Gray, 55-gallon, open top (removable top) drums will be used for the temporary containment of uncharacterized drill cuttings and PPE. These environmental materials are awaiting the results of chemical analyses for contaminant characterization.
  2. Gray, 55-gallon, closed top drums will be used for moving environmental liquids to the main EG&G decontamination facility and emptied.

Other closable transfer containers, appropriately sized for the volume of water generated by the tasked activity, may also be used for moving environmental liquids associated with drilling activities to the holding tanks at the central decontamination facility.

Uncontaminated disposable PPE and uncontaminated miscellaneous solid environmental materials will be placed in garbage cans lined with plastic bags at the work area. When full, these plastic bags will be transferred to EG&G's custody at a designated transfer area.

7.2 MARKING

The subcontractor will give a sequential number for each gray drum received. A two-letter subcontractor ID will follow directly behind the drum ID number. The letter ID will be chosen by the subcontractor. For example, "1326WC" would identify Drum Number 1326 handled by Woodward-Clyde. Additionally, an identifying marking will be associated with each drum. A Drum Field Log Form (Form FO.10A, see Section 7.0, Documentation) will be used by the subcontractor to track each drum used for containing solid environmental materials until returned to EG&G.

7.2.1 Environmental Liquids

Environmental liquids generated within the following work areas will be characterized as potentially contaminated:

- Surface water and sediment sampling stations which have not been verified as background locations
- Work areas where drilling activities are being conducted

These environmental liquids will be placed in gray drums or appropriately sized liquid transfer containers and moved by the subcontractor's personnel. Field personnel should decant the environmental liquids from one drum (or container) to another (or from a trough to a drum or transfer container) if the amount of sludge and sediment within the environmental liquids is substantial. The residual sediment will be contained in gray drums as described in Subsection 6.3.2. The environmental liquids will then be brought to the central EG&G decontamination facility. The decontamination facility will have an area specifically designed to receive environmental liquids. The environmental liquids area will include a decanting process to remove residual sludges and sediments remaining within the liquid. The subcontractor will empty the entire drum's contents into this area. The environmental liquids will be pumped from the decanting area to holding tanks. When a liquid holding tank is full, an EG&G designated subcontractor will take a representative sample from the tank for volatile organic analysis (see SOP FO.12, Decontamination Facility Operations). Environmental liquids must be transported to the 374 evaporator or the granulated activated carbon (GAC) unit within 90 days.

The following marking and handling procedures apply to any containers used for moving environmental liquids:

- In addition to the ID number, the drums or liquid containers will be marked with the words "NONPOTABLE PENDING ANALYSIS."

- A paint stick (or indelible marker) should be used to apply identifying marks on liquid transfer containers to ensure that the markings will not be washed away during decontamination or precipitation. Paint should not be applied in the vicinity of sampling or field monitoring events to prevent cross-contamination of samples.

- Identifying marks should be legible, approximately 2 inches high, and written on two (opposite) sides and on the top of the container.

- A Radiological Engineering-approved contractor Environmental Health and Safety Specialist will do a radiation screening test on the exterior of the container before the container leaves the work area. If necessary, the exterior of the container will be decontaminated.

- Environmental liquids container lids will be secured before the containers are moved. Containers will be moved in trucks with enclosed sides and <u>will not</u> be stacked.

- After the container's contents have been emptied, the subcontractor's personnel will decontaminate the container prior to any additional use (see SOP FO.3, General Equipment Decontamination).

- Empty gray drums may be stored by the subcontractor at a designated location in the work area. Drums will be banded to prevent them from blowing away.

- The subcontractor will designate personnel to inspect the integrity of the drums on a weekly basis. Drums will be inspected for damage according to the Hazardous Waste Requirements Manual (HWRM). Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. The subcontractor will report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Damaged drums must have their contents transferred to an undamaged drum. The results of this inspection will be documented on a Drum Inspection Form (Form FO.10B, see Section 7.0-Documentation), dated, and signed by the person performing the inspection.

- Any containers used off site, such as decontamination and wash water containers, must meet DOT specifications for containers, markings, and labeling (see Subsection 6.3.2).

For surface water field activities in areas characterized as background stations (uncontaminated), wash water and rinse water will be disposed of on the ground at least 50 feet from the sampling location such that the waste water cannot discharge into any stream, pond, or other surface water impoundment.

Wash water used to clean equipment, personnel, or vehicles during surface soil sampling or groundwater sampling in work areas characterized as not potentially contaminated where no verified positive readings were detected on field monitors will be disposed of approximately 50 feet from the sampling location. The disposal location must be at least 200 feet from any stream drainage.

7.2.2 Temporary Containment of Solid Environmental Materials Pending Characterization

Gray drums will be used for the temporary containment of solid environmental materials that are pending characterization including drill cuttings and PPE. For drums that will contain drill cuttings, a liner will be placed in the drum and two liters of desiccant will be placed in the bottom of the drum. Two additional liters will be put into the drum when the drum has been filled half full. Cuttings will be placed in the drum until the drum is full. After filling, gray drums will be sealed, marked, and placed on pallets. Representative environmental samples from an associated well, boring, or sampling location will be sent to an off site laboratory for a full suite of analytical results to characterize these environmental materials. The drums will remain at the drilling site until a Waste Operations storage area is available. At the time Waste Operations notifies EM that space is available, the drums will be moved to the transfer/storage area to await assessment of the associated environmental samples.

The subcontractor will perform the following steps to ensure the proper handling of the gray drums until transferred to EG&G custody:

- In addition to the drum number, the drums will be marked with the words "ENVIRONMENTAL MATERIAL PENDING ASSESSMENT"; the associated well, boring, or sampling number and location; the word "SOIL", or "PPE" (for disposable personnel protective equipment), as appropriate; the subsurface interval (if soil); and the date the drum was filled. (Soils will not be commingled with miscellaneous environmental materials or PPE within a drum.)

- A paint stick (or indelible marker) should be used to apply identifying marks on drums to ensure that the marks will not be washed away during decontamination or precipitation. A paint stick should not be applied in the vicinity of sampling or field monitoring events to prevent cross-contamination of samples.

- Identifying marks should be legible, with characters approximately 2 inches high, and written on two (opposite) sides and on the top of the drum.

- Gray drums will be placed on wood pallets at the drilling site.

- The appropriate information will be documented on the Drum Field Log Form (Form FO.10A).

- Gray drums will be transferred to EG&G's custody at a designated pickup/transfer area only after the drum's contents have been characterized. The drums should be placed on wood pallets at the pickup/transfer area to assist the transfer.

- A Radiological Engineering-approved contractor Environmental Health and Safety Specialist will do a radiation screening test on the exterior of the drum before the drum leaves the work area. If necessary, the exterior of the drum will be decontaminated.

- Drum lids will be secured and drums will be moved in trucks with enclosed sides.

- A copy of the completed Drum Field Log Form (Form FO.10A) will be given to the receiving EG&G Waste Operations personnel (see Section 7.0, Documentation).

- Drums will be decontaminated prior to any reuse, and the old markings will be spray-painted over and/or a new marking applied if the old markings are no longer valid for the intended drum reuse.

- Old drum numbers will be scraped off, and a new drum number will be applied to the drum.

When the validated chemical analyses from the environmental samples are received by EG&G, Waste Operations will be sent a summary of the results from the EG&G project manager. If the drum's contents are determined to be uncontaminated, the contents will be disposed of in the landfill.

If the drums are determined to contain hazardous substances, mixed substances, or radioactive substances, the gray drums will be painted the appropriate color corresponding to the characterization of the drum's contents and labeled appropriately (See Section 7.3, Labeling, below) by EG&G Waste Operations.

Field monitoring including OVDs and radiation detectors will be used during intrusive activities regardless of the work area classification. SOP FO.8, Handling of Drilling Fluids and Cuttings describes the use of field monitors for intrusive activities as well as verifying positive readings.

7.3 LABELING

Gray drums containing solid environmental materials that have been characterized as radioactive or mixed will be painted white. If the drum's contents have been characterized as radioactive but not hazardous, the drum will be labeled with a "White I" radioactive label. If the drum's contents have been characterized as mixed, the drum will be labeled with an ORM-E label per HWRM and the On-site Transportation Manual requirements.

Gray drums containing solid environmental materials that have been characterized as hazardous only will be painted white on the ends and black in the center. These drums will be labeled with an ORM-E sticker per HWRM and the On-site Transportation Manual requirements.

8.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Observations and data will be recorded on drum field log forms. Subcontracting personnel may also choose to document the observations and data in a personal field notebook in addition to the field log forms. If a field book is used, entries should be made with a black waterproof ink pen. The field notebook should be waterproofed and have consecutively numbered pages.

It is recommended that the subcontractor bring duplicate copies of the completed Drum Field Log Form when transferring custody of waste drums to EG&G personnel. Both copies should be signed by the receiving EG&G representative. EG&G Waste Operations will retain one signed copy and the subcontractor will retain the second signed copy in the project files.

Drum forms will be kept in the subcontractor's project files until the project is completed. All project files will be turned over to EG&G at this time (see SOP FO.2, Field Documentation).

8.1 DRUM FIELD LOG FORMS

A Drum Field Log Form will be kept on each drum by the subcontractor from the time of issuance until returned to an EG&G representative. At a minimum, the forms will include the following:

- The name of the subcontractor issued the drum
- The color of the drum
- The identification number with the subcontractor's ID
- The date the drum was issued
- The location of the field activity area
- The contents of the drum (include the subsurface interval if contents are soils from a well or boring)
- The date the drum was filled
- The date the drum was decontaminated or returned to EG&G (include the EG&G facility where the drum was returned to)

Form FO.10A is an example of the Drum Field Log Form to be used. Drum log forms must be checked and updated immediately upon handling. In addition to the drum marking, the Drum Field

Log Form will identify the drum and provide a history of the drum. All the field log forms combined will be used to track the movement of environmental materials generated during EM field operations.

8.2 DRUM INSPECTION FORM

The subcontractor is responsible for conducting weekly inspections of all the gray drums they have been issued until the drum is returned to EG&G. Weekly inspections will ensure that the integrity of the drums is maintained. The Drum Inspection Form (Form FO.10B) will be used to document these inspections.

8.3 CONTAMINANT CHARACTERIZATION FORM

The Contaminant Characterization Form (Form FO.10C) will be used for the characterization of materials that have been temporarily stored in gray drums until analytical results are received. Upon receipt of all the sample methods for each sample associated with the drum, the subcontractor will submit the drum identification portion of the form along with the analytical results to the EG&G project manager. The drum contents will be characterized by an EG&G representative based on the chemical analyses and returned to EG&G's Waste Operations personnel.

8.4 COMPUTER LOG FORMS

All information found on drum field log forms may be entered into a computer database by designated subcontractor personnel. This will allow the immediate tracking of any environmental drum used by a subcontractor during EM field activities and will provide a backup to the field log forms.

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

DRUM FIELD LOG FORM

FORM FO.10A

NAME OF THE SUBCONTRACTOR .... ______

DRUM ID NUMBER WITH SUBCONTRACTOR'S ID............. ______

LOCATION AND DATE OF ISSUANCE .... LOC ______ DATE ______

NAME AND LOCATION OF FIELD ACTIVITY .... NAME ______ LOC ______

ASSOCIATED WELL, BORING, OR SAMPLING LOCATION .... NAME ______ ______

CONTENTS OF DRUM .... ______

SUBSURFACE INTERVALS (IF SOILS) .... ______ ______

BAG #S (IF PPE) ______ ______

ASSOCIATED SAMPLE ID #S .... ______ ______

DATE DRUM WAS FILLED .... ______

SIGNATURE OF PERSON FILLING THE DRUM .... ______

IF SOLID ENVIRONMENTAL MATERIALS

LOCATION OF TEMPORARY STORAGE AREA .... ______

DATE DRUM RETURNED TO EG&G .... ______

SIGNATURE OF EG&G REPRESENTATIVE .... ______

IF ENVIRONMENTAL LIQUIDS

DATE AND LOCATION WHERE CONTENTS WERE EMPTIED AND DECONNED .... DATE ______ LOC ______

(EXAMPLE: 2/18/91 DECON PAD #____)

FORM FO.10B

DRUM INSPECTION FORM

DRUM ID NUMBER/SUB ID ____________________

INSPECTION DATE	STATUS	INSPECTOR'S SIGNATURE

(4011-REV)(FORMFO10AB.WK1)(6/7/91)

CONTAMINANT CHARACTERIZATION FORM
FOR GRAY DRUMS PENDING CHARACTERIZATION

ATTACH CHEMICAL RESULTS OF ASSOCIATED SAMPLES

THIS PORTION WILL BE COMPLETED BY SUBCONTRACTOR

Name of the Subcontractor Issued the Drum .... ____________

The serialized Drum ID number with the
Subcontractor's ID .... ____________

The Date the Drum Was Taken to a Field Activity .... ____________

The Location of the Field Activity Area .... ____________

The Contents of the Drum .... ____________
(Subsurface Intervals, if Soils)
(Bag #s, if PPE)

____
____
____
____

The Date the Drum was Filled .... ____________

The Associated Well, Boring, or Sample location .... ____________

Matrix of Samples Analyzed .... ____________

Sample ID #s .... ____________
____
____
____
____

Intervals Samples were Taken From .... ____________
____
____
____
____

Date Submitted to EG&G for Characterization .... ____________

Subcontractor's Representative Signature .... ____________

THIS PORTION WILL BE COMPLETED BY EG&G

The Contaminant Characterization of the Drum's Contents .... ____________

Signature of EG&G Representative Determining the
Contaminant Characterization and Date Signed .... ____________
Date ____________

EG&G Holding Facility Where Drum Will be Stored .... ____________

Date and Time Form Returned to Waste Operations .... Date ______ Time ______

APPENDIX FO.10A

TABLE FO.10-A1
ROCKY FLATS PLANT
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
101	207 SOLAR EVAPORATION PONDS
102	OIL SLUDGE PIT
103	CHEMICAL BURIAL
104	LIQUID DUMPING
105	OUT-OF-SERVICE FUEL TANKS
	105.1 - WESTERNMOST TANK
	105.2 - EASTERNMOST TANK
106	OUTFALL
107	HILLSIDE OIL LEAK
108	TRENCH T-1
109	TRENCH T-2
110	TRENCH T-3
	TRENCHES T-4 TO T-11
	111.1: TRENCH T-4
	111.2: TRENCH T-5
	111.3: TRENCH T-6
	111.4: TRENCH T-7
	111.5: TRENCH T-8
	111.6: TRENCH T-9
	111.7: TRENCH T-10
	111.8: TRENCH T-11
112	903 DRUM STORAGE AREA
113	MOUND AREA
114	PRESENT LANDFILL
115	ORIGINAL LANDFILL
116	MULTIPLE SOLVENT SPILLS
	116.1: WEST LOADING DOCK AREA
	116.2: SOUTH LOADING DOCK AREA

Note: This information is based on the administrative record including the information submitted in the hazardous and low-level mixed waste Part B application dated November 1, 1985, as modified by the subsequent revision dated November 28, 1986, as modified by the subsequent revision dated December 15, 1987, and the transuranic mixed waste Part B application submitted July 1, 1988, Thereafter referred to as the applications. This information is also based on independent review of historical aerial photographs of the facility and independent review of facility submittals.

INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
117	CHEMICAL STORAGE
	117.1: NORTH SITE
	117.2: MIDDLE SITE
	117.3: SOUTH SITE
118	MULTIPLE SOLVENT SPILLS
	118.1: WEST OF BUILDING 731
	118.2: SOUTH END OF BUILDING 776
119	MULTIPLE SOLVENT SPILLS
	119.1: WEST AREA
	119.2: EAST AREA
120	FIBERGLASSING AREAS
	120.1: NORTH OF BUILDING 664
	120.2: WEST OF BUILDING 664
121	ORIGINAL PROCESS WASTE LINES
122	UNDERGROUND CONCRETE TANK
123	VALVE VAULT 7
	123.1: VALVE VAULT 7
	4,000 GALLON TANK #67)
125	HOLDING TANK
126	OUT-OF-SERVICE PROCESS WASTE TANKS
	126.1: WESTERNMOST TANK
	126.2: EASTERNMOST TANK
127	LOW-LEVEL RADIOACTIVE WASTE LEAK
128	OIL BURN PIT NO. 1
129	OIL LEAK
130	RADIOACTIVE SITE - 800 AREA SITE #1
131	RADIOACTIVE SITE - 700 AREA SITE $1
132	RADIOACTIVE SITE - 700 AREA SITE #4
133	ASH PITS
	133.1:ASH PIT 1-1
	133.2:ASH PIT 1-2
	133.3:ASH PIT 1-3
	133.4:ASH PIT 1-4
	133.5:INCINERATOR
	133.6:CONCRETE WASH PAD
134	LITHIUM METAL DESTRUCTION SITE
135	COOLING TOWER BLOWDOWN

TABLE FO.10-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
136	COOLING TOWER PONDS
	136.1 : NORTHEAST CORNER OF BUILDING 460
	136.2 : WEST OF BUILDING 460
	136.3 : S. OF BLDG. 460, W. OF BLDG. 444
137	COOLING TOWER BLOWDOWN - BLDG. 774
138	COOLING TOWER BLOWDOWN - BLDG. 779
139	CAUSTIC/ACID SPILLS
	139.1: HYDROXIDE TANK AREA
	139.2: HYDROFLUORIC ACID TANKS
140	REACTIVE METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142.1: A-1 POND
	METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142.1: A-1 POND
	142.2: A-2 POND
	142.3: A-3 POND
	142.4: A-4 POND
	142.5: B-1 POND
	142.6: B-2 POND
	142.7: B-3 POND
	142.8: B-4 POND
	142.9: B-5 POND
	142.10: C-1 POND
	142.11: C-2 POND
	142.12 NEWLY IDENTIFIED A-5 POND
143	OLD OUTFALL
144	SEWER LINE BREAK
145	SANITARY WASTE LINE LEAK
146	CONCRETE PROCESS WASTE TANKS
	146.1: 7,500 GALLON TANK (#31)
	146.2: 7,500 GALLON TANK (432)
	146.3: 7,500 GALLON TANK (*34W)
	146.4: 7,500 GALLON TANK (#34E)
	146.5: 3,750 GALLON TANK (*30)
	146.6: 3,750 GALLON TANK (#33)
147	PROCESS WASTE LEAKS
	147.1: MAAS AREA
	147.2: OWEN AREA
148	WASTE SPILLS
149	EFFLUENT PIPE

TABLE FO.10-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF. NO.	SITE NAME
150	RADIOACTIVE LIQUID LEAKS (8)
	150.1: NORTH OF BUILDING 771
	150.2: WEST OF BUILDING 771
	150.3: BETWEEN BUILDINGS 771 ant 774
	150.4: EAST OF BUILDING 750
	150.5: WEST OF BUILDING 707
	150.6: SOUTH OF BUILDING 779
	150.7: SOUTH OF BUILDING 776
	150.8: NORTHEAST OF BUILDING 770
151	FUEL OIL LEAK
152	FUEL OIL TANK
153	OIL BURN PIT NO. 2
154	PALLET BURN SITE
155	903 LIP AREA
156	RADIOACTIVE SOIL BURIAL
	156.1: BUILDING 334 PARKING LOT
	156.2: SOIL DUMP AREA
157	RADIOACTIVE SITE
	157.1: NORTH AREA
	157.2: SOUTH AREA
158	RADIOACTIVE SITE - BLDG. 551
159	RADIOACTIVE SITE - BLDG. 559
160	RADIOACTIVE SITE - BLDG. 444 PK LOT
161	RADIOACTIVE SITE - BLDG. 664
162	RADIOACTIVE SITE - 700 AREA SITE #2
163	RADIOACTIVE SITE - 700 AREA SITE #3
	163.1: WASH AREA
	163.2: BURIED SLAB
164	RADIOACTIVE SITE - 800 AREA SITE #2
	164.1: CONCRETE SLAB
	164.2: BUILDING 886 SPILLS
	164.3: BUILDING 889 STORAGE PAD
165	TRIANGLE AREA
166	TRENCHES
	166.1: TRENCH A
	166.2: TRENCH B
	166.3: TRENCH C
167	SPRAY FIELDS - THREE SITES
	167.1: NORTH AREA
	167.2: POND AREA
	167.3: SOUTH AREA
168	WEST SPRAY FIELD

TABLE FO.10-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF NO.	SITE NAME
169	WASTE DRUM PEROXIDE BURIAL
170	P.U.& D. STORAGE YARD - WASTE SPILLS
171	SOLVENT BURNING GROUND
172	CENTRAL AVENUE WASTE SPILL
173	RADIOACTIVE SITE - 900 AREA
174	P.U.&D. CONTAINER STORAGE FACILITIES (2)
175	S&W BLDG. 980 CONTAINER STORAGE FACILITY
176	S&W CONTRACTOR STORAGE YARD
177	BUILDING 885 DRUM STORAGE AREA
178	BUILDING 881 DRUM STORAGE AREA
179	BUILDING 865 DRUM STORAGE AREA
180	BUILDING 883 DRUM STORAGE AREA
181	BUILDING 334 CARGO CONTAINER AREA
182	BUILDING 444/453 DRUM STORAGE AREA
183	GAS DETOXIFICATION AREA
184	BUILDING 991 STEAM CLEANING AREA
185	SOLVENT SPILL
186	VALVE VAULT 12
187	ACID LEAKS (2)
188	ACID LEAK
189	MULTIPLE ACID SPILLS
190	CAUSTIC LEAK
191	HYDROGEN PEROXIDE SPILL
192	ANTIFREEZE DISCHARGE
193	STEAM CONDENSATE LEAK
194	STEAM CONDENSATE LEAK
195	NICKEL CARBONYL DISPOSAL
196	WATER TREATMENT PLANT BACKWASH POND
197	SCRAP METAL SITES
198	VOCs IN GROUND WATER
199	CONTAMINATION OF THE LAND SURFACE
200	GREAT WESTERN RESERVOIR
201	STANDLEY RESERVOIR
202	MOWER RESERVOIR
203	INACTIVE HAZARDOUS WASTE STORAGE AREA
204	ORIGINAL URANIUM CHIP ROASTER
205	BLDG. 460 SUMP 43 ACID SIDE
206	INACTIVE D-836 HAZARDOUS WASTE TANK
207	INACTIVE 444 ACID DUMPSTER
208	INACTIVE 444/447 WASTE STORAGE AREA
209	SURFACE DISTURBANCE SOUTHEAST OF BLDG. 881
210	UNIT 16, BUILDING 980 CARGO CONTAINER

TABLE FO.10-A1 (cont.)
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REF NO.	SITE NAME
211	UNIT 26, BUILDING 881 DRUM STORAGE
212	UNIT 63, BUILDING 371 DRUM STORAGE
213	UNIT 15, 904 PAD PONDCRETE STORAGE
214	UNIT 25, 750 PAD PONDCRETE AND SALTCRETE STORAGE
215	UNITS 55.13, 55.14, 55.15, 55.16 - TANKS T-40, T-66, T-67, T-68
216	EAST SPRAY FIELDS 216.1: NORTH AREA 216.2: CENTER AREA 216.3: SOUTH AREA
217	UNIT 32, BUILDING 881, CN- BENCH SCALE TREATMENT

EG&G ROCKY FLATS PLANT		**Manual:**	**5-21000-OPS**
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Category 2		**Effective Date:**	**August 30, 1991**
		Organization:	**Environmental Management**

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

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TITLE:
FIELD COMMUNICATIONS

Approved By: J. W. Langman Jr. 9/1/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) provides procedures that will be used at The Rocky Flats Plant (RFP) to establish subcontractor internal and external communication links, and basic emergency communication needs.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

A short training session on use of telephones and radios will be conducted by the subcontractor's Site Manager. Concomitantly, a discussion of communication etiquette and emergency signals will be included in the training. The Site Manager should document the names of all personnel attending these training sesions in the daily log book. The Site Manager will post the names and phone numbers of key personnel to be contacted in case of emergency.

In case of an emergency, the Emergency Coordinator (EC) for the RFP is the Shift Supervisor on duty. The EC will respond to all emergencies and coordinate emergency response activities. The EC will activate the Emergency Operation Center (EOC), notify departments that have an advisory role in the situation, and contact off-site agencies (police, medical, etc.) if required.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

EG&G. Rocky Flats Plant Envioronmental Restoration Health and Safety Program Plan. October 1990.

EG&G. Rocky Flats Plant Envioronmental Restoration Health and Safety Program Plan. October 1990.

5.0 COMMUNICATION PROCEDURES

5.1 COMMUNICATIONS INTERNAL TO SUBCONTRACTOR'S OPERATION

5.1.1 Radios and Telephones

A communication center will be established at the subcontractor's field trailer office. This office will be equipped with a telephone communications system for routine operations. Field radios and chargers are assigned and issued to subcontractors by EG&G's Environmental Management (EM), RFP. Radios are assigned as follows:

- 1 radio per field team
- 1 radio for the field trailer
- 1 radio for the site supervisor
- 1 radio for the site Health and Safety Officer
- 1 to 2 radio(s) as spares

All subcontractor radios shall be operated on channel 3.

All subcontractors assigned under EM share the same radio network and channel.

Field teams will utilize the two-way radio system for contact with both the field office trailer and other field teams. The radio system will be part of the RFP network so that field crews have a direct link to emergency response groups if an emergency occurs. In the event of an emergency, procedures outlined in the Site Health and Safety Plan shall be followed. If a temporary shortage of radios occurs, subcontractors can arrange to use each other's field trailer radio for communications with their respective field crews. Since multiple subcontractors share the same radio network and channel, it is important for field crews to exercise prudent use of field radios. Any field crew declaring an emergency shall have priority on radio usage. All other personnel not involved in the emergency or emergency response shall refrain from radio usage until the emergency is resolved. Additionally, proper demeanor will be maintained on the radio network at all times. This means that no profanity or coarse language will be used in transmitting messages.

Radio transmissions will not use codes to deliver messages. Radios requiring repair will be exchanged with EG&G EM.

5.1.2 Alarms

All personnel working on the RFP will be trained to immediately recognize RFP and Emergency Response site alarm signals.

Standard alarm signals must be documented in each Site Plan. Subcontractors can call 966-7541 to listen to a recording of RFP alarm signals and the significance of each.

In addition to the standard RFP and Emergency Response site alarm signals, field crews involved in drilling or other loud-noise activities will utilize a compressed air horn to communicate the alarm messages identified below:

- One long blast -- evacuate area in a cross-wind direction
- Two short blasts -- localized problem (not dangerous to workers)
- Two long blasts -- all clear

Field crews will use hand signals to indicate an understanding of the alarm message as appropriate.

5.1.3 Buddy System

Most field activities will be conducted in pairs or groups of personnel. This system, known as the buddy system, ensures that all personnel receive assistance if required. Additionally, the buddy system minimizes the health and safety risks associated with any hazardous area.

The buddy system alone may not be sufficiant to ensure that help will be provided in an emergency. Therefore, workers in the activity area should be in line-of-sight contact or communications contact with backup personnel in the work area.

5.1.4 Hand Signals

The following standard hand signals shall be used in the event of failure of radio communications or if wearing personal protective equipment impedes hearing:

- Hand gripping throat -- out of air, cannot breathe
- Grip partner's wrist or both hands around partner's waist -- leave area immediately
- Hands on top of head -- need assistance
- Thumbs up -- ok; I am all right; I understand
- Thumbs down -- no; negative

5.2 EXTERNAL COMMUNICATION

The specifics for each field activity will be delineated in the Health and Safety Plan accompanying that activity. In general, the following is applicable to all situations.

The closest accessible telephone during all working hours will be identified by the Site Safety Officer (SSO) prior to commencing field activities if communication with the field trailer office communications center is not possible. All guard posts have telephones. Emergency telephone numbers will be posted near the field office telephone as follows:

Rocky Flats Plant Medical Facility (Building 122, Central Avenue)

Ambulance Service	966-2911
General Information	966-2594
Rocky Flats Fire	
Emergency	966-2911
Routine	966-4336
Rocky Flats Police/Security	
Emergency	966-2911
Routine	966-2444
Spill Response	
Emergency	966-2911
Non-Emergency	966-2914

When reporting an emergency provide as much detail as possible, such as:

- Your name
- Your location
- Exact location of the emergency
- Nature of emergency
- Condition of patient if applicable
- Special hazards in the area
- Any other information requested

In addition, the names and phone numbers of key personnel at Emergency Response remedial project sites with the authority and training to respond to accidents and emergencies must be provided in the subcontractor's Site Plan and posted on site so that they are readily accessible to site workers. Key site personnel to be contacted in the event of an emergency are as follows:

1. EG&G Shift Supervisor
2. EG&G Environment Restoration Project Manager
3. EG&G Site Health & Safety Coordinator
4. Subcontractor Field Manager
5. Subcontractor Health & Safety Officer

The EG&G Shift Supervisor, with assistance from the EG&G Site Safety Officer, has responsibility and authority for coordinating all emergency response activities until proper authorities arrive and assume control.

6.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting pertinent field observations and data. Observations of violations that could affect worker health and safety will be recorded by field personnel with black waterproof ink in a bound weatherproof field notebook with consecutively numbered pages. Any observations that need to be permanently documented will be entered into the site manager's daily activity notebook. Entries must be signed and dated by personnel making the entries.

EG&G ROCKY FLATS PLANT	Manual:	5-21000-OPS
~~EMD MANUAL~~ OPERATION SOP	Procedure No.:	FO.12, Rev. 1
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Category 2	Effective Date:	August 30, 1991
EG&G — ROCKY FLATS PLANT ENVIRONMENTAL MANAGEMENT DEPARTMENT	Organization:	Environmental Management

This is a RED Stamp

TITLE:
DECONTAMINATION FACILITY OPERATIONS

Approved By: J. W. Langman Jr. 9/10/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

LIST OF FIGURES

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at the Rocky Flats Plant (RFP) Main Decontamination Facility (MDF). MDF as used in the context of environmental materials management at RFP refers to a fixed facility that will generally include a paved and bermed area equipped with sumps, pumps, and pressurized sprays intended for use in decontaminating large items that could not conveniently be decontaminated in a relatively uncontrolled environment. Currently, one MDF is under construction. However, the Environmental Management (EM) plans include the construction of additional MDF facilities. The terminology MDF should not be interpreted to refer to any specific RFP decontamination facility.

This SOP is applicable to all decontamination operations conducted as part of the Environmental Management (EM) Program and is specifically applicable to heavy equipment and environmental materials containers (drums) used in a work area characterized by EG&G as potentially contaminated (See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers). This SOP is also specifically applicable to heavy equipment and environmental materials containers used in a work area characterized as not potentially contaminated but where field monitoring conducted during intrusive activities indicates the possible presence of contamination. This SOP does not apply to heavy equipment and environmental materials containers used in a work area characterized by EG&G as not potentially contaminated if field monitoring conducted during intrusive activities does not indicate the presence of contamination. However, a subcontractor may choose to follow the procedures established by this SOP as general practice.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

The EG&G project manager has the overall responsibility for implementing this SOP and will construct MDFs as needed; provide certain equipment, as listed in Subsection 5.1, Equipment To Be Provided at the MDF; and designate a subcontractor to be responsible for the day-to-day operation of the MDF. For the purposes of this SOP, the designated subcontractor is referred to as the DSC.

The subcontractor designated to maintain the MDF is responsible for providing general use equipment; coordinating with MDF users to ensure efficient utilization of the MDF; performing routine maintenance, operations, and minor repairs to equipment and facilities; managing environmental liquids and residual sediments that are brought to the MDF; and maintaining documentation.

Individual subcontracting companies using the MDF are responsible for coordinating with the DSC, providing the items specified in Subsection 5.2 and as described in Subsection 6.3, conducting the decontamination of their own equipment, and verifying the decontamination effectiveness. Additional equipment-specific decontamination guidance is available within SOP FO.4, Heavy Equipment Decontamination; SOP FO.5, Handling of Purge and Development Water; SOP FO.7, Handling of Decontamination Water and Wash Water; SOP FO.8, Handling of Drilling Fluids and Cuttings; and SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

All subcontractor's project managers will be responsible for assigning project staff to implement this SOP and for ensuring the heavy equipment and environmental materials containers used by the subcontractor are decontaminated according to the procedures outlined in this SOP.

All personnel performing these procedures are required to have the appropriate health and safety training as specified in 29 CFR 1910.120. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary. Personnel using light or heavy equipment, scientific monitoring devices, or operating vehicles must have appropriate training or licenses.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. NIOSH/OSHA/USCG/EPA. October 1985.

Nuclear Weapon Accident Response Procedures (NARP) Manual. The Defense Nuclear Agency. January 1984. Change 1, July 1984.

Radiological Operating Instruction 3.1, Performance of Surface Contamination Surveys. EG&G.

Standard Operating Safety Guides. EPA. November 1984.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.4, Heavy Equipment Decontamination

- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples
- SOP FO.16, Field Radiological Measurements
- SOP SW.6, Sediment Sampling

5.0 EQUIPMENT REQUIRED

Various equipment items, supplies, and structures must be provided for the MDF to function as intended. In an attempt to simplify this subject, the equipment listing has been divided into these subsections: Subsection 5.1, Equipment and Supplies to be Provided at the MDF; Subsection 5.2, Equipment and Supplies to be Provided by MDF Users; and Subsection 5.3, MDF Configuration.

5.1 EQUIPMENT AND SUPPLIES TO BE PROVIDED AT THE MDF

The following is a list of equipment that will be provided at the MDF for general use. The party responsible (EG&G or the DSC) for providing each item is indicated in parentheses.

- Drains and tanks for the collection and holding of decontamination and rinse solutions (EG&G)

- One or more moveable tanks for containing RFP tap water for use during decontamination (DSC)

- Pumps for moving liquids from one container to another container (DSC)
- High pressure steam cleaner and high pressure wash and rinse systems (DSC)
- Portable power generator (DSC)
- Splash curtains (EG&G)
- Wooden pallets (EG&G)
- A rough terrain forklift or equivalent heavy equipment item outfitted with a "drum grappler" (DSC)
- A drum rack designed to hold empty 55-gallon drums in a manner that promotes an outward flow of decontamination fluids from the drum interior as it is being decontaminated (EG&G)
- Flammable storage facility/cabinet (EG&G)
- A "dumpster" for containerizing uncontaminated environmental materials (EG&G)
- A two wheeled "dolly" designed to carry 55-gallon drums (DSC)
- Plastic sheeting (DSC)
- Long and short-handled stiff bristle brushes (DSC)
- Wire brushes (DSC)

- Wash and rinse buckets for equipment interiors (DSC)
- Premoistened towelettes (DSC)
- Duct tape or equivalent (DSC)
- Windsock or equivalent method for decontamination workers to determine the wind direction (DSC)
- A bottom filling bailer or equivalent to collect water samples (DSC)
- Grey, removable-top 55-gallon drums (EG&G)

5.2 EQUIPMENT AND SUPPLIES TO BE PROVIDED BY MDF USERS

Each subcontractor that uses the MDF will provide the following equipment and supplies as needed to complete their decontamination activities:

- Personal protective equipment (PPE) as required by the site-specific Health and Safety Plan
- Environmental materials containers (obtained from EG&G) for used PPE, non-reusable items required to complete decontamination, and soils dislodged during decontamination
- An organic vapor detector (OVD) and a radiation monitor to screen equipment and environmental materials containers for an estimate of the effectiveness of decontamination efforts

- Wash and rinse buckets necessary to establish a personal decontamination line

- Any equipment or task specific decontamination fluids required by a SOP or SOPA but that are not listed as being available at the MDF

- Blank environmental materials container labels to replace any completed labels that become dislodged or rendered illegible during the decontamination process

5.3 MDF CONFIGURATION

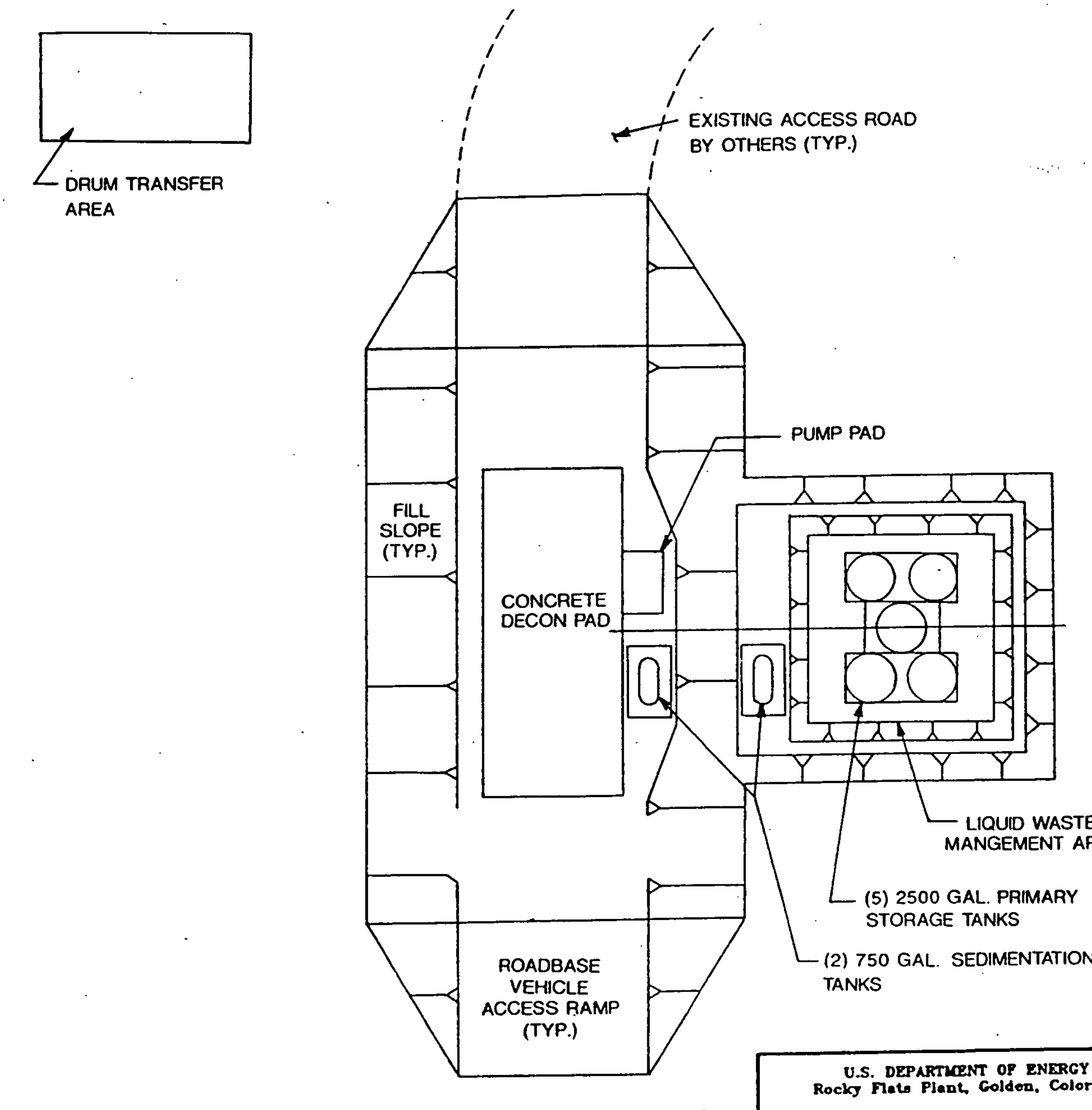
A typical MDF is depicted in Figure FO.12-1, MDF Configuration. A MDF consists of three functional areas, the equipment decontamination pad, the environmental liquids management area, and the drum transfer area.

5.3.1 Equipment Decontamination Pad

The equipment decontamination pad includes a drainage system, a sump for collection of fluid runoff, and a pumping system for moving fluids from the sump to the environmental liquids management area. Wet sediments will be removed from the sump manually.

5.3.2 Environmental Liquids Management Area

The environmental liquids management area consists of large holding tanks enclosed by berms, and sedimentation tanks located between the bermed area and the decontamination pad. All environmental liquids will be emptied into the sedimentation tanks, and when the residual sediments have settled, the relatively sediment free liquids will be pumped from the sedimentation tanks to the large holding tanks.



TYPICAL MDF CONFIGURATION

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 2
PHASE II RFI/RI WORK PLAN (BEDROCK)

RFP-903 PAD
DRILLING

Figure FO.12-1 1/24/91

5.3.3 The Drum Transfer Area

The drum transfer area is the point at which subcontractors transfer colored drums containing environmental materials suspected of containing radioactive and/or hazardous substances to EG&G representatives. Transfers of filled drums will normally occur at the conclusion of each day of field operations. Partially filled environmental materials drums will be stored at a temporary staging area at the drum transfer area until they are retrieved for complete filling. When full, drums will be placed at the designated drum transfer point.

6.0 PROCEDURES

6.1 INTRODUCTION

Effective decontamination procedures are required to minimize the potential for cross-contamination, offsite contaminant migration, and personnel exposure from improperly decontaminated equipment. Heavy equipment and environmental materials containers may become contaminated in either of the two following scenarios: (1) when used in a work area characterized as potentially contaminated such as an Individual Hazardous Substance Site (IHSS) or (2) when used in a work area characterized as not potentially contaminated but where field monitoring conducted during field activities indicates the possible presence of contamination. Because contamination is not always easily discernible, it will be assumed that equipment used in one of the two preceding scenarios has been contaminated and will, therefore, require decontamination.

Procedures established in this SOP are not applicable for heavy equipment used in a work area characterized as not potentially contaminated where no verified positive detections were encountered during field monitoring. However, heavy equipment used in these work areas may be washed at the MDF. Form FO.4A, Heavy Equipment Decontamination/Wash Checklist and

Record, Sections I, II, and III, will be completed for heavy equipment decontaminated or washed (See SOP FO.4, Heavy Equipment Decontamination).

6.2 DESIGNATED SUBCONTRACTOR (DSC)

The subcontractor designated to maintain the MDF is responsible for providing general use equipment as specified in Subsection 5.1; coordinating with MDF users to ensure efficient utilization of the MDF; performing routine maintenance, operations, and minor repairs to equipment and facilities as described below; managing environmental liquids and residual sediments (as described in Subsection 6.5) that are placed at the MDF; and maintaining documentation as described in Section 7.0.

6.2.1 Coordinating With MDF Users

The DSC will coordinate with MDF Users by accomplishing the following:

- Maintaining and issuing keys to subcontractors required to use the MDF
- Maintaining a roster of subcontractors that have been issued keys and a point of contact to receive information regarding the operation of the MDF
- Devising and posting a system of priorities for use of the MDF
- Informing other subcontractors of any changes to this SOP
- Scheduling foreseeable periods of "downtime" and notifying other subcontractors of both scheduled and unscheduled periods of "downtime"

- Scheduling use of the rough terrain forklift

6.2.2 Routine Maintenance, Operations, and Minor Repairs

At the beginning of each day of EM field operations, the DSC will perform the following:

- Visually inspect the MDF to verify that the required equipment and supplies are on-hand.
- Reinstall splash screens if they have been removed and repair any tears by applying duct tape or equivalent over the tear on both sides of the curtain.
- Perform routine maintenance on equipment by following instructions in the equipment owners manuals.
- Fill decontamination fluid and rinse fluid reservoirs.
- Pump any liquids in the sedimentation tanks into a holding tank. If, after the liquid has been pumped, a sufficient amount of sediment has accumulated, the sediment will be drummed, sampled, and handled as described in Subsection 6.5.4.
- When necessary, use the steam generator to deice the MDF.
- Complete Form FO.12B, Equipment Decontamination Pad Daily Inspection Checklist.

At the end of each day of EM field operations, the DSC will perform the following:

- Decontaminate all MDF structural surfaces, powered equipment, and nonpowered equipment.

- Use an OVD to monitor the MDF surfaces, then collect and have radiological smear tests counted, as described in SOP FO.16, Field Radiological Measurements. If either the OVD or the smear tests indicate the presence of contamination, the involved surfaces will be decontaminated again and remonitored.

- Drain and winterize all equipment that could be damaged internally by the freezing of fluids (Note: Ethylene glycol will not be used as an antifreeze in any of the pressurized spray systems).

- Pump any liquids from the floor sump into a decanting tank.

6.3 MDF USERS

Subcontractors using the MDF are responsible for providing the items specified in Subsection 5.2; conducting decontamination of equipment and verification of decontamination effectiveness as described previously in Subsection 6.1; coordinating with the DSC; and conducting operations at the MDF as described below.

6.3.1 Coordinating With the DSC

Before a subcontractor may initially use the MDF, that subcontractor must register with the DSC by signing for a key to the MDF, designating an employee to be responsible for the key and to serve as a point of contact to interface with the DSC. MDF users are to maintain strict control over the key to the MDF and notify the DSC if any above normal usage of the MDF is anticipated.

6.3.2 Operations At the MDF

- Splash screens must be closed if pressurized sprays are to be used.

- Subcontractors should request that DSC personnel pump the MDF floor drain sump if planned decontamination activities are likely to cause the sump to overflow.

- The "buddy system" will be employed while decontamination activities are being conducted with the splash screens closed.

- Decontamination procedures for heavy equipment and/or environmental materials containers will preempt equipment washing operations described in Subsection 6.1.

- Items from different work areas will not be decontaminated simultaneously within the sereened-in area of the MDF.

- Each MDF user will steam clean all surfaces within the screened portion of the MDF after each use. Screens used to enclose the decontamination pad and equipment used during equipment decontamination will be steam cleaned.

6.4 PERSONAL DECONTAMINATION

- MDF users will bring a sufficient quantity of containers to the MDF to establish a personal decontamination line as required by the site-specific health and safety plan. DSC personnel will decontaminate the personal decontamination containers that hold decontamination and rinse fluids.

- DSC personnel will conduct personal decontamination as described in the applicable Health and Safety Plan.

- Personal decontamination lines will not be established downwind of any pressurized sprays being used at the MDF.

6.5 ENVIRONMENTAL MATERIALS HANDLING AND SAMPLING

Environmental materialss generated at the MDF will normally fit within one of the following categories.

- Unrepairable equipment

- PPE worn by MDF users decontaminating equipment or environmental materials containers

- PPE worn by DSC employees working at the MDF

- Water brought to the MDF by subcontractors and water used to decontaminate equipment and environmental materials containers

- Sediments in the decontamination pad floor drain sump and sediments in the sedimentation tank's bottom

The handling and sampling of each environmental materials category is described in the following sections. Any subcontractor that anticipates environmental materialss other than those listed above will coordinate the proposed handling procedures with the appropriate EG&G representative before implementing the proposed procedures.

6.5.1 Unrepairable Equipment And PPE Worn By DSC Employees

Unrepairable equipment and PPE used by DSC employees working at the MDF will be thoroughly decontaminated and placed in a dumpster for uncontaminated environmental materialss.

6.5.2 PPE Worn by MDF Users

PPE worn during decontamination of equipment and/or environmental materials containers used in the field will be disposed of in the same manner as PPE used during the field operation that warranted the decontamination activity.

6.5.3 Environmental Liquids

Environmental liquids will be emptied into the sedimentation tanks before being pumped into holding tanks. When a holding tank becomes full, the DSC will open the tank, monitor the tank interior with an OVD, and will use a bottom filling bailer or equivalent to collect a sample. Water samples will be analyzed by an EG&G approved laboratory for the target compound list (TCL) volatiles. The sampler will be decontaminated as described in SOP FO.3, General Equipment Decontamination, before and after each sample collection event. The sample will be collected from the middle portion of the tank. As the bailer is removed from the holding tank, its contents will be emptied into a sample container and the container sealed. The sample container exterior will then be decontaminated and the sample transferred to the DSC's sample manager for marking and handling as described in SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples. All samples will be marked to reflect the holding tank they were drawn from. After sampling, the tank will be sealed to prevent the addition of more water after sampling has occurred.

Results of sample analysis will used by an EG&G representative to determine the disposition of the tank's contents. If the total concentration of TCL volatile organics is less than 1 part per million (ppm), the DSC will notify EG&G Waste Operations personnel who will use an appropriately sized water container to transport the holding tank contents to the EG&G evaporation tank. If the total TCL volatile organics concentration is greater than 1 ppm, the DSC will pump approximately one-half of the holding tank's contents into a separate holding tank and then add water from either an unsampled holding tank or from the settling basins. Resampling will be accomplished and the analytical results used to determine how each holding tank's contents will be handled. These procedures will be conducted every time a holding tank becomes full.

6.5.4 Sediments in the Decontamination Pad Floor Drain Sump and Sediments in the Sedimentation Tank Bottoms

Sediments generated at the MDF will be composited in grey drums. Grey drums used by the DSC will be obtained, marked, and handled as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. At the end of each day of operation, any sediments that remain in the MDF floor drain sump will be placed into the same sedimentation tank as the water that was pumped from the sump. If at the beginning of each day of operation, the depth of sediments remaining in the settling basins appears to be sufficient to fill a 55-gallon drum, representative sediment samples will be collected using the General Sampling Procedure for collecting sediment material (See SOP GW.6, Sediment Sampling). Collected samples will be transferred to the DSC's designated representative to be analyzed for target analyte list (TAL) metals; TCL analytes; volatiles, semi-volatiles, pesticides/PCBs; water quality parameters, pH, nitrate, and percent solids; and radionuclides. After samples have been collected, the sediment will be removed from the settling basin and placed into a grey drum.

6.6 DRUM TRANSFER AND DRUM STAGING

The drum transfer area and the drum staging area at the MDF will be identified by signs and each area will be delineated by rope.

6.6.1 Drum Transfer Procedures

Filled drums will be sealed and marked as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers, before being transported to the MDF. At the MDF, each subcontractor will decontaminate the filled drums (See SOP FO.4, Heavy Equipment Decontamination) and place each drum at the drum transfer area for custody transfer to EG&G Waste Operations.

Subcontractors will maintain a Drum Field Log Form (See SOP FO.10) on each drum issued to them by EG&G. The Drum Field Log Form is partially completed in the field and documents the type of environmental materials contained in the drum. When EG&G Waste Operations personnel take custody of the drums, subcontractor personnel will complete the Drum Field Log Form by recording the name of the EG&G representative receiving the drum.

6.6.2 Drum Staging Procedures

Partially-filled drums will be sealed and marked as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers, before being transported to the MDF. At the

MDF, each subcontractor will decontaminate the partially-filled drums (See SOP FO.4, Heavy Equipment Decontamination) and place each partially-filled drum at the drum staging area.

It is the responsibility of each subcontractor to maintain Drum Field Log Forms that correspond to the drums placed at the drum staging area and to retrieve and complete the filling of those drums at the first opportunity. The "first opportunity" is defined as the next field activity likely to generate environmental materials that are suitable for placement in the staged drums.

7.0 DOCUMENTATION

The DSC responsible for operation of the MDF will maintain a bound activities log book. The activities log is intended to reflect the daily activities accomplished in order to operate the MDF. Additionally, Form FO.12A, Main Decontamination Facility Daily Record of Activities and Form FO.12B, Equipment Decontamination Pad Daily Inspection Checklist, will be completed on a daily basis.

A Drum Field Log Form (Form FO.10A) will be kept on each drum issued to the DSC until the drum is returned to an EG&G representative.

The DSC will conduct an inspection of the drums within the temporary staging area or any grey drum used for general use. The inspection should be conducted at least monthly. The Drum Inspection Form (Form FO.10B) will be used to document these inspections.

A Contaminant Characterization Form (FO.10C) will be used for the characterization of the environmental materialss generated at the MDF that have been placed in grey drums and are suspected to contain radioactive and/or hazardous substances. (The preceding forms are described in detail in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.)

MAIN DECONTAMINATION FACILITY
DAILY RECORD OF ACTIVITIES

Facility and Equipment Inspection

Facilities and Equipment Operational: ________ Yes ___ No (if no explain & describe corrective action)

____

____

____

Management of Main Decontamination Facility (MDF)

Listing of Subcontractors Issued MDF Keys:

Name	Phone
______________________	____________
______________________	____________
______________________	____________

Record of Information Disseminated to MDF Users

____

____

____

____

MDF Environmental materials Management Activities

Environmental Liquids Holding Tanks Sampled:

Tank(s) Number(s) ______________________________________

____

MDF Pad Sampling Liquid Pumped And Dredger Removed _____ Yes _____ No (if No explain) ______

____

____

Results of MDF Facility and Equipment Monitoring.

OVD _________ FIDLER ______________

____

(Name) (Subcontractor) (Phone)

EQUIPMENT DECONTAMINATION PAD DAILY INSPECTION CHECKLIST

The Equipment Decontamination Pad is to be visually inspected at the beginning of each day of Environmental Management (EM) field operations. The following items are to be included as part of the daily inspection. All deficiencies should be reported to the Decontamination Operations Manager immediately. Decontamination operations should not commence until all deficiencies have been corrected.

EQUIPMENT DECONTAMINATION PAD	ACCEPT	NONACCEPT	COMMENTS
1) Check fill slope for excessive erosion or cracking.			
2) Check fill slope for unusual staining which may be indicative of leakage.			
3) Check copolymer pad coating for cracking, peeling, bubbling, staining, or any unusual appearance.			
4) Check concrete decontamination pad for cracking, chipping, spalling, or any unusual appearance.			
5) Check that floor sump has been pumped clean of any liquids.			
6) Check splash screens for any tears and inspect integrity of previous repairs.			
7) Inspect all tanks, joints, gauges, pipes, and couplings for any drips, leaks, residues, or signs of corrosion.			
8) Inspect berms around environmental liquids management area for breaches, cracks, and/or signs of excessive erosion.			
9) Estimate the remaining capacity in each of the environmental liquids tanks as well as the sedimentation tanks.			
10) Make sure decontamination fluid and rinse fluid reservoir levels are adequate.			
11) Check tank tie downs and make sure they are tight.			
12) Inspect monitor pipe weekly for fluid leaking to the inner liner.			
13) Ensure that all signs and labels are in place.			

INSPECTOR: ____

Print Name Signature

COMPANY: ______________________________ DATE: ____________

EG&G ROCKY FLATS PLANT	Manual:	5-21000-OPS
~~EMD MANUAL OPERATION SOP~~	Procedure No.:	FO.13, Rev. 1
	Page:	1 of 18
	Effective Date:	August 30, 1991
Category 2	Organization:	Environmental Management

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

TITLE:
CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

Approved By:

J. W. Langman Jr. 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDIXES

LIST OF TABLES IN APPENDIX FO.13A

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats to define the SOPs addressing sample containers, preservatives, handling, packaging and shipping of soil/sediment and water samples collected at the Rocky Flats Plant (RFP).

3.0 RESPONSIBILITIES AND QUALIFICATIONS

All personnel performing these procedures are required to have the appropriate health and safety training as specified in the site-specific Health and Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures.

Only qualified personnel will be allowed to perform these procedures. Required qualifications are based on minimum of a two year science related degree and/or education, previous experience, on-the-job training, and supervision by an onsite chemist. The subcontractor's project manager will document personnel qualifications related to this procedure in the subcontractor's project QA files.

4.0 REFERENCES

4.1 SOURCE REFERENCES

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

DOE 1987: The Environmental Survey Manual. DOE/EH-0053, Volumes 1-4. August 1987.

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,. Interim Final. October 1988.

RCRA Facility Investigation Guidance. Interim Final. May 1989.

Rocky Flats Plant Environmental Restoration Program, Quality Control Plan. January 1989.

Technical Enforcement Guidance Documentation (TEGD) USEPA. 1986

Test Methods for Evaluating Solid Waste, Volume II: Field Manual Physical/Chemical Methods. USEPA. SW-846. 3rd Edition. November 1986.

User's Guide to the Contract Laboratory Program. USEPA. December 1988.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are:

- SOP FO.3, General Equipment Decontamination
- SOP FO.14, Data Base Management
- SOP GW.6, Groundwater Sampling
- SOP GT.8, Surface Soil Sampling
- SOP SW.6, Sediment Sampling
- SOP SW.3, Surface Water Sampling
- SOP SW.7, Collection of Tap Water Samples
- SOP SW.8, Pond Sampling
- SOP SW.9, Industrial Effluent and Pond Discharge Sampling

5.0 EQUIPMENT

5.1 EQUIPMENT LIST

The following list of equipment is not intended to be task specific. The equipment and materials shown are the minimum that may be needed to ensure that proper procedures are followed for sample handling, packaging, and shipping.

- Sample containers/bottles
- Coolers
- Thermometer
- Blue ice
- Sample labels
- COC forms
- Decontamination equipment[1]
- Preservatives
- Baggies for containers
- Bubble wrap
- Vermiculite or equivalent
- Strapping and clear tape
- Custody seals
- Garbage bags
- Metal paint cans[2]

---

1 Decontamination equipment and procedures are thoroughly discussed in the SOP FO.3, General Equipment Decontamination

2 Large enough to accommodate sample containers

Appropriate uses for the equipment listed are detailed in the following sections of this SOP.

5.2 DEPARTMENT/OFFICE CONTACT LIST

EG&G or its designee is responsible for obtaining the appropriate documentation for RAD screening, and monitoring of all field samples for shipment off site.

The following departments will need to be contacted before sample shipment.

- Construction Management Coordinator - To obtain property of materials off site for shipment
- Radiation Site Survey Office - For radiation monitoring and clearance of offsite shipment of coolers
- On-site General Laboratories - For radiological screening and categorization of field samples

6.0 PROCEDURES

Procedures for the containerizing, preserving, handling and shipping of soil and water samples detailed in this SOP follow strict criteria of the USEPA's Contract Laboratory Program. This SOP is intended to present general guidelines for proper sample handling and any deviations or modifications will be documented in the Scope of Work or specific Task Order as well as SOP addendum forms.

6.1 SAMPLE CONTAINERS AND PRESERVATIVE

Only sample containers certified as clean by the manufacturer will be used for sample collection. The containers and preservatives may be obtained from the contracted analytical W.)Oratory, their designated supplier, or a suitable chemical supply company. Any preservative(s) required may be added to the container by the contracted analytical laboratory, field sampling team, sample manager, and/or on-site chemist prior to or during sample collection.

The matrices discussed in this SOP for chemical and radiological parameters are:

Soil Matrix - to include soils, sediments, and sludges (see SOP GT.8, Surface Soil Sampling, SOP SW.6, Sediment Sampling)

Water Matrix - to include surface water, groundwater and process liquids (see SOP GW.6, Groundwater Sampling; SOP SW.3, Surface Water Sampling, SOP SW.7, Collection of Tap Water Samples; SOP SW.8, Pond Sampling; and SOP SW.9, Industrial Effluent and Pond Discharge Sampling)

Tables A-1 and A-2 show both CLP and non-CLP parameters of interest for water and soil matrices with the associated container size, preservatives (chemical and/or temperature); and holding times. Tables A-3 and A-4 show radiological parameters, containers, preservatives, and holding times for water and soil matrices.

6.2 CONTAINER LABELING, DECONTAMINATION, AND FIELD PACKAGING

Prior to sample collection, the sample bottles will be labeled by the sample manager or an assistant. Collection time and date will be marked in the field by the sampler. The labels will indicate:

- Activity name and/or number
- Unique sample number
- Sample time and date
- Chemical preservative used
- Sample type (grab, composite)
- Analyses required
- Filtered/unfiltered
- Comments or special precautions, as needed
- Samplers initials

The sample label will be marked with a black waterproof pen. If needed, clear tape will be placed over labels before sampling to assure that the labels remain legible.

Subsequent to sampling, the exterior of the sample containers will be decontaminated according to SOP No. 13, General Equipment Decontamination, bagged in plastic bags, and placed in coolers dedicated for sample and sample container transportation. The temperature in the coolers will be maintained at approximately 4°C by adding sealed plastic bags containing blue ice (or an equivalent) to the coolers.

During the initial stages of field work, the sample manager should use a thermometer to verify that an adequate amount of blue ice is being used to maintain sample temperature at approximately 4°C.

6.3 CHAIN OF CUSTODY RECORD

Official custody of samples must be maintained and documented from the time of collection until the time that valid analytical results have been obtained or the laboratory has been released to dispose of the sample. The sampling team will be responsible for initiating the original chain of custody (COC) form and will sign and date this form when relinquish% custody of samples to the sample manager. Upon receipt, the sample manager will check the COC and all sample labels to ensure that all samples are accounted for and in good condition, and that no efforts were made in labeling and/or completing the COC.

A sample is considered to be in a person's custody if any of the following conditions are met:

- The sample is in the person's physical possession.
- The sample is in line of sight of the person after he/she has taken possession.
- The sample is secured by that person so that any tampering can be detected.
- A sample is secured by the person in possession in an area which only authorized personnel can enter.

6.3.1 Tampering of Sample Containers

If, at any time after samples have been secured, custody seals are identified as having been tampered with, this procedure will be followed to ensure that sample integrity has not been compromised.

- Check cooler temperature to verify 4°C.
- Check with all personnel having access to sample coolers to verify possible inadvertent tampering.

- Check every sample container for any signs of tampering, such as loose lids, foreign objects in containers, broken or leaking containers, etc.

- Check to ensure adequate and appropriate packaging.

- Document all findings of the incident in the sample manager's field log book.

If it is determined that malicious tampering of samples has occurred and/or it is believed that sample integrity has been compromise the subcontractor will immediately contact EG&G.

If it can be determined that sample integrity has not been compromised based on the above criteria, document findings in sample manager's field logbook and proceed with this standard operating procedure.

6.3.2 Chain of Custody Form

The three-page carbonless COC Form (Form FO.13A) is shown in Section 8.0, Documentation. An example of a completed COC Form is illustrated in Figure FO.13-1. The original and second (yellow) copy will be included with the samples to be shipped enclosed in a plastic bag and taped inside the lid of the cooler. The third (pink) copy along with a photocopy of the original with remain on file at the subcontractors on-site facility. The contract laboratory will sign as having received the samples and return the yellow copy of the COC to the project management office for verification by the QA/QC officer or their designee. The yellow and pink copies will then be matched and filed to complete the chain of custody procedure.

The chain of custody form will include the following information:

- Unique sample number and sample location

CONTRACTOR Webeegood SAMPLERS Jim Fine, Fred Good PROJECT # 4000-0

SITE CONTACT/PHONE Sample Manager 966-1234 LAB/LOCATION FYI Labs / Flint, Mich

C-O-C NUMBER 0001

EG&G ROCKY FLATS, CHAIN OF CUSTODY

DATE	TIME	SAMPLE NUMBER	LOCATION	CONTAINER TYPE	NUMBER OF CONTAINERS	MEDIA SOIL(S) WATER (W)	FILTERED=F POT DISS=P	TURN AROUND RUSH =R	OUT OF SPEC REPORTS	COOLED TO 4 C	Zn(C2H3O2)2	NAOH	HNO3	H2SO4	VOA - CLP	VOA - SO2. 2	BNA - CLP	PCB's/PEST. - CLP	CLP TOTAL METALS(1)	CLP DISS. METALS(1)	WATER QUALITY (2)	NO3/NO2 as N	Tot. Phosphate, NH4	OIL & GREASE	Ortho-Phosphate	NO2	CYANIDE	TOC	DOC	H2S	Cr IV			RAD SCREEN
				BOTTLE CODES											V	V	B	P	M	M	W	W	W	W	W	W	W	W	W	W	W			R
																D	A			*	A	B	B	C	D	D	E	H	I	J	K			H
				PRESERVATIVE												C	R					C	D		A	B								
8/1/91	1000	SW01234WC	SW038	40 ml ag	2	W			X	X						X																		
8/1/91	1010	SW01234WC	SW038	1 L poly	1	W			X	X			X						X															
8/1/91	1015	SW01234WC	SW038	1 L poly	1	W	X		X	X			X							X														
8/1/91	1020	SW01234WC	SW038	1 L poly	1	W			X	X											X													
8/1/91	1025	SW01234WC	SW038	500 ml poly	1	W			X	X				X								X	X											
8/1/91	0950	SW01234WC	SW038	1 L glass	1	W			X	X				X										X										
8/1/91	1030	SW01234WC	SW038	1 L poly	1	W			X	X		X															X							
8/1/91	1040	SW01234WC	SW038	500 ml poly	1	W			X	X	X	X																		X				
8/1/91	1045	SW01234WC	SW038	100 ml poly	1	W			X	X																								X

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME	
Fred Good	8/1/91	1630	Sample Manager	8/1/91	1700
Sample Manager	8/2/91	1030	Joe Cool (FYI Labs)	8/3/91	1030

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

REMARKS (1) INCLUDES Cs,Li,Sr,Mo,Si,Sn
(2) TSS,TDS,Cl,F,SO4,CO3,HCO3

SHIPMENT METHOD

FIGURE FO.13

- Project number
- Date and time of sample collection
- Signature of collector or field custodian
- Laboratory designation
- Sample matrix
- Condition of sample on receipt at the laboratory
- Chain of custody control number
- Signature and date blocks for personnel relinquishing or receiving sample custody
- Space for additional comments
- Name and phone number of emergency contact person
- Analysis requested
- Out of spec reporting

6.4 FIELD DATA DOCUMENTATION

All field descriptions, measurements, and observations will be recorded on the appropriate field data forms (see specific sampling SOPs and SOP FO.14, Field Data Management) in accordance with SOP FO.2, Field Data Documentation. The original data forms will be collected and filed on site by the designated subcontractor's data entry personnel. These forms are to be bound and submitted to EG&G with an accompanied transmittal letter, for the duration of the task, on a monthly schedule for the entire duration of the task. This form is an example of data entries required for the Rocky Flats Environmental Data System (RFEDS) database. Data may also be recorded in field logbooks if desired. Field data will be filled out at the time a sample is taken and will include, but not be limited to, the following information:

- Sampling activity name and number
- Sampling point name and number

- Sample number*
- Name(s) of collector(s) and others present
- Date and time of sample collection*
- Sample container tag number (if appropriate)*
- Preservative(s) used*
- Requested analyses*
- Sample matrix*
- Filtered/unfiltered*
- Designation of QC samples* (ONLY for MS and MSD)
- Collection methods
- Chain of custody control numbers
- Field observations and measurements during sampling (comment section)
- Signature of responsible observer

6.5 PACKAGING AND SHIPPING

Prior to commencement of field activities, estimated levels of chemical and/or radiological contaminants will be determined from known historical data for all matrices to be sampled by EG&G or its designee. This SOP addresses procedures for low, medium, and high level concentrations. The three levels of concentrations are defined as follows:

- Low-Concentration Samples - The contaminant of highest concentration is present at less than 10 parts per million (ppm). Examples include background environmental samples.

* Items will be documented on the COC Form.

- Medium-Concentration Samples - The contaminant of highest concentration is present at a level greater than 10 ppm and less than 15 percent (150,000 ppm). Examples include material that is obviously weathered.

- High-Concentration Samples - At least one contaminant is present at a level greater than 15 percent. Samples from drums and tanks are assumed to high concentration unless information indicates otherwise.

Radiation screening of field samples as determined by EG&G and their subcontractors will be sent to the on-site General Laboratory. The RAD screening procedures determine which laboratory receives samples based on results of greater than (GT) OR less than (LT) 50 picocuries/liter for waters or 50 picocuries/gram for soils. The RAD screening procedures will also enable the subcontractor to follow applicable Department of Transportation (DOT) guidelines for shipment of these environmental samples.

All sample containers will have been decontaminated and bagged in the field. Upon receipt and verification of sample containers and COC forms, the following steps will be taken:

- The designated laboratory will be notified prior to shipment if samples collected in the field are suspected of containing any other substance for which the laboratory personnel should take additional safety precautions.

- Contact the Radiation Site Survey Office so that all containers to be shipped off site can be radiologically cleared.

- Obtain property passes signed by the Construction Management Coordinator and the Radiation Site Survey Officer so that coolers may be shipped off site.

- Line the sample cooler with a large plastic bag.
- Place approximately 3 inches of vermiculite in the bottom of the cooler.
- Wrap glass containers in bubble pack.
- Verify that all samples requiring screening have reported estimated radiological activity levels.
- Place bagged and wrapped sample containers (except VOC vials) upright in the cooler with approximately 1 inch between them.
- Place bagged and wrapped sample containers upright, except for the volatile organic compounds (VOC) vials in the cooler with approximately 1 inch between them and the sides of the cooler.
- Fill the cooler approximately three-quarters full of vermiculite, making sure that sample containers are securely packed.
- Insert the two VOC vials upright in the center of the cooler.
- Fill the cooler with vermiculite, allowing adequate space at the top for blue ice.
- Bag the blue ice (or equivalent) and place several packages in the top space of the cooler**.

** See Appendix A, Tables 1 and 2 for parameters requiring 4°C ± 2°C.

- Seal the signed COCs in a plastic bag and tape it to the underside of the lid of the cooler.

- Tape the drain of the cooler shut.

- Wrap strapping tape around the cooler in two locations to secure the lid.

- Place the airbill on top of the cooler. If more than one cooler is sent to the same laboratory, an address label and a manifest label are needed.

- Place "This Side Up" labels on all four sides and "Fragile" labels on the top and two sides of the cooler.

- Place "Environmental Samples" labels on top of cooler. For coolers weighing over 75 pounds, an additional "Heavy Weight" label is required in the upper left corner on top of the cooler.

- Place signed and dated custody seals in two locations sealing the cooler lid so that tampering will be evident.

The following steps will be taken for samples suspected of containing both medium and/or high level concentrations:

- Enclose all sample containers in clear plastic bags.

- Pack all medium and high level water and soil samples in metal paint can.

- Label paint cans with sample number of sample contained inside.

- Surround contents of can with non-combustible, absorbent packing material.

- Use freezer packages cool samples to 4°C.

- Pack sealed paint cans or plastic-enclosed sample bottles in shipment container.

- Use a metal ice chest for shipment (do not use cardboard or styrofoam containers to ship samples).

- Surround contents with non-combustible, absorbent packing material (do not use earth or ice packing materials).

- Tape paperwork in plastic bags under cooler lid.

- Close cooler and seal with custody seals.

Sample coolers may be received by courier at a predetermined area at RFP. If arrangements cannot be made, a company vehicle is required to deliver sample coolers to the laboratory and/or courier office.

7.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance (QA) and Quality Control (QC) will be administered according to the QAPJP, the project-specific Quality Assurance Addendum (QAA), and QC requirements presented in this SOP.

8.0 DOCUMENTATION

Documentation of observations and data acquired in the field will provide information on the handling and preparation of the samples collected in addition to a permanent record. Sampling personnel will be responsible for documenting the handling preparation, packaging, and shipping of the samples. These observations and data will be recorded with black waterproof ink on subject specific data sheets, (i.e. instrument calibration data sheet, field measurement data sheet and/or field logbooks).

Copies of the chain of custody records for the samples shipped during the data collection task will be kept on file at the site office and the subcontractor's main office.

CONTRACTOR ____________________ SAMPLERS ____________________ PROJECT # ____________

SITE CONTACT/PHONE ____________________ LAB/LOCATION ____________________

C-O-C NUMBER

EG&G ROCKY FLATS, CHAIN OF CUSTODY

	VOA - CLP	VOA - 502. 2	BNA - CLP	PCB's/PEST. - CLP	CLP TOTAL METALS(1)	CLP DISS. METALS(1)	WATER QUALITY (2)	NO3/NO2 as N	Tot. Phosphate, NH4	OIL & GREASE	Ortho-Phosphate	NO2	CYANIDE	TOC	DOC	H2S	Cr IV			
BOTTLE CODES	V	V	B	P	M	M	W	W	W	W	W	W	W	W	W	W	W			
		D	A			*	A	B	B	C	D	D	E	H	I	J	K			
PRESERVATIVE		C	R					C	D		A	B								

DATE/TIME		SAMPLE NUMBER	LOCATION	CONTAINER TYPE	NUMBER OF CONTAINERS	MEDIA SOIL(S) WATER (W)	FILTERED=F POT DISS=P	TURN AROUND RUSH =R	OUT OF SPEC REPORTS	COOLED TO 4 C	Zn(C2H3O2)2	NAOH	HNO3	H2SO4	VOA - CLP	VOA - 502. 2	BNA - CLP	PCB's/PEST. - CLP	CLP TOTAL METALS(1)	CLP DISS. METALS(1)	WATER QUALITY (2)	NO3/NO2 as N	Tot. Phosphate, NH4	OIL & GREASE	Ortho-Phosphate	NO2	CYANIDE	TOC	DOC	H2S	Cr IV			

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME	

REMARKS (1) INCLUDES Cs,Li,Sr,Mo,Si,Sn
(2) TSS,TDS,Cl,F,SO4,CO3,HCO3

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION ______C		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

SHIPMENT METHOD

CONTRACTOR ____________ SAMPLERS ____________ PROJECT # ____________

SITE CONTACT/PHONE ____________ LAB/LOCATION ____________

C-O-C NUMBER

EG&G ROCKY FLATS, CHAIN OF CUSTODY

												BOTTLE CODES	R	R	R	R	R	R	R	R	R	R	R	R								
													A	B	C	D	F	A	B	C	D	F	G	H								
										PRESERVATIVE								*	*	*	*	*										
DATE/TIME		SAMPLE NUMBER	LOCATION	CONTAINER TYPE	NUMBER OF CONTAINERS	MEDIA SOIL(S) WATER (W)	FILTERED=F POT DISS=P	TURN AROUND RUSH =R	OUT OF SPEC REPORTS	HCl	HNO3			GROSS ALPHA / BETA	Pu 239/240 AM241	U 233/234,235,238	Sr89/90 Cs137 (1)	Th230/232,CM244,NP237	DISS GROSS ALPHA/BETA	DISS Pu 239/240 Am 241	DISS U233/234,235,238	DISS Sr 89/90 Cs 137 (1)	DISS Th230/2 CM244 NP237	TRITIUM (H3)	RAD SCREEN							

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME	

REMARKS * INDICATES FILTERED SAMPLE
(1) + Cs 134 WHEN BY GAMMA

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION ______C		
CORRECTED COPY ATTACHED		
PROBLEMS OR DISCREPANCIES		

SHIPMENT METHOD

CONTRACTOR ____________ SAMPLERS ____________ PROJECT # ____________

SITE CONTACT/PHONE ____________ LAB/LOCATION ____________

C-O-C NUMBER

EG&G ROCKY FLATS, CHAIN OF CUSTODY

BOTTLE CODES

PRESERVATIVE

DATE/TIME	SAMPLE NUMBER	LOCATION	CONTAINER TYPE	NUMBER OF CONTAINERS	MEDIA SOIL(S) WATER (W)	FILTERED=F POT DISS=P	TURN AROUND RUSH =R	OUT OF SPEC REPORTS	COOLED TO 4 C	HCl	NAOH	HN03	H2S04

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME

REMARKS

LABORATORY USE ONLY	Y	N
PCKG REC'D/CUSTODY SEALS INTACT		
SAMPLE LABELS/COCs AGREE		
TEMPERATURE WITHIN SPECIFICATION ______C		
CORRECTED COPY ATTACHED		

PROBLEMS OR DISCREPANCIES

SHIPMENT METHOD

APPENDIX FO.13A

NON-RADIOLOGICAL AND RADIOLOGICAL TABLES

TABLE A-1
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR TARGET COMPOUND AND TARGET ANALYTE LISTS

WATER MATRIX

Parameter	Container	Preservative	Holding Time
Liquid - Low to Medium Concentration Samples			
Organic Compounds:			
Purgeable Organics (VOCs)	2 x 40-mL VOA vials with teflon lined septum lids	Cool, 4°C[a] with HCl to pH<2	7 days 14 days
Extractable Organics (BNAs), Pesticides and PCBs	1 x 4-L amber[b] glass bottle	Cool, 4°C[a]	7 days until extraction, 40 days after extraction
Organophosphorus Pesticides and Herbicides	1 x 4-L amber[b] glass bottle	Cool, 4°C	7 days until extraction, 40 days after extraction
Dioxins/Furans	2 x 1-L amber[b] glass bottles	Cool, 4°C	7 days until extraction, 40 days after extraction
Inorganic Compounds:			
Metals (TAL)	1 x 1-L polyethylene bottle	Nitric acid pH<2	6 mo[c]
Cyanide	1 x 1-L polyethylene bottle	Sodium hydroxide[d] pH>12; Cool, 4°C	14 days
Sulfide	1 x 1-L polyethylene bottle	1 mL-zinc acetate sodium hydroxide to pH>9; Cool, 4°C	7 days

[a] Add 0.008% sodium thiosulfate ($Na_2S_2O_3$) in the presence of residual chlorine

[b] Container requirement is for any or all of the parameters given.

[c] Holding time for mercury is 28 days.

[d] Use ascorbic acid only if the sample contains residual chlorine. Test a drop of sample with potassium iodine-starch test paper; a blue color indicates need for treatment. Add ascorbic acid, a few crystals at a time, until a drop of sample produces no color on the indicator paper. Then add an additional 0.6g of ascorbic acid for each L of sample volume.

TABLE A-1 (continued)
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES
FOR MISCELLANEOUS PARAMETERS

WATER MATRIX

Parameter	Sample Volume /Container	Preservative	Holding Time
Liquid - Low to Medium Concentration Samples			
Acidity	200 mL/P, G	Cool, 4•C	14 days
Alkalinity	200 mL/P, G	Cool, 4•C	14 days
Bacteriological	1 L/P,G	Cool, 4•C	6 hr
Static Bioassay	4 L	Cool, 4•C	48 hr
Biochemical Oxygen Demand (BOD)	2 L/P, G	Cool, 4•C	48 hr
Chemical Oxygen Demand (COD)	300 mL, P, G	Cool, 4•C, Sulfuric Acid to pH<2	28 days
Chloride	200 mL/P, G	None	28 days
Chlorine Residual	In situ, beaker or bucket	None	Analyze immediately
Color	200 mL	Cool, 4•C	48 hr
Conductivity	300 mL/P, G	Cool, 4•C	28 days (determine on-site if possible)
Chromium, Hexavalent	200mL/P, G	Cool, 4•C	24 hr
Dissolved Oxygen (Probe)	In situ, beaker or bucket	None	Determine on-site
Dissolved Oxygen (Winkler)	300 mL glass, BOD bottle	Fix on site, store in dark	8 hr (determine on-site if possible)

TABLE A-1 (continued)

SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR MISCELLANEOUS PARAMETERS

WATER MATRIX

Parameter	Sample Volume /Container	Preservative	Holding Time
Liquid - Low to Medium Concentration Samples (continued)			
Toxicity Characteristic Leaching Procedure (TCLP)	4 L amber glass	Cool, 4°C	Extract within 7 days, analyze within 40 days
Fluoride	1 L/P	None	28 days
Hardness	300 mL/P, G	1:1 Nitric Acid, pH<2	6 mo
Nutrients[c]	2 L/P, G	1:1 Sulfuric Acid, pH<2, Cool, 4°C	28 days
Oil and Grease	2 x 1-L widemouth glass with Teflon liner	1:1 Sulfuric Acid, pH<2, Cool, 4°C	28 days
Organic Halides - Total (TOX)	250 mL amber glass with Teflon lined septum closure	Sulfuric Acid, pH<2; Cool, 4°C	14 days
pH	In situ, beaker or bucket	None	Analyze Immediately
Phenols	1-L amber glass with Teflon lined closure	1:1 Sulfuric Acid, pH<2, Cool, 4°C	28 days
Phosphate-Ortho	500 mL/P, G	Filter-on-site, Cool, 4°C	48 hr
Phosphorus, Total Dissolved	500 mL/P, G	Filter-on-site, 1:1 Sulfuric Acid, pH<2, Cool, 4°C	28 days

[c] May include nitrogen series (ammonia, total Kjeldahl, nitrogen, nitrate-nitrite), total phosphorus, chemical oxygen demand.

(4011-454-39)(table.A1)(02/19/91)

TABLE A-1 (continued)

SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR MISCELLANEOUS PARAMETERS

WATER MATRIX

Parameter	Sample Volume /Container	Preservative	Holding Time
Liquid - Low to Medium Concentration Samples (continued)			
Solids, Settleable	2 L/P, G	Cool, 4°C	48 hr
Solids (Total and Suspended, etc.)	1 L/P, G	Cool, 4°C	7 days
Sulfates	500 mL/P, G	Cool, 4°C	28 days
Sulfides	1 L/P, G	2 mL Zinc Acetate Sodium Hydroxide to pH>9 Cool, 4°C	7 days
Temperature	In situ, beaker or bucket	None	Analyze Immediately
Turbidity	200 mL/P, G	Cool, 4°C	48 hr

Abbreviations:
ASAP - as soon as possible
NS - not specified
P - Plastic
G - Glass

Note: When nonspecific container type is listed (e.g., 8-oz. wide-mouth glass jar), select a container appropriate to the volume and container requirement given. Samples for more than one parameter can be collected into a single container if container and preservation requirements are the same (e.g., sulfate and tubidity).

TABLE A-2
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES
FOR TARGET COMPOUND AND TARGET ANALYTE LISTS

SOIL MATRIX

Parameter	Container	Preservative	Holding Time
Soil, Sediment or Sludge Samples - Low to Medium Concentrations			
Organic Compounds:			
Purgeable Organics (VOCs)	2 x 120-mL wide-mouth glass vials	Cool, 4•C	7 days
Extractable Organics (BNAs), Pesticides and PCBs	1 x 8-oz wide-mouth glass jar	Cool, 4•C	7 days until extraction, 40 days after extraction
Organophosphorous Pesticides and herbicides	1 x 8-oz wide-mouth[b] glass jar	Cool, 4•C	7 days until extraction, 40 days after extraction
Dioxins/Furans	1 x 8-oz wide-mouth glass jar	Cool, 4•C	7 days until extraction, 40 days after extraction
Inorganic Compounds:			
Metals (TAL)	1 x 8-oz wide-mouth glass jar	None	6 mo[1]
Cyanide	1 x 8-oz wide-mouth glass jar	None	14 days
Sulfide	1 x 8-oz wide-mouth glass jar	None	7 days

[1]Holding time for mercury is 28 days.

TABLE A-2 (continued)
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR MISCELLANEOUS PARAMETERS

SOIL MATRIX

Parameter	Sample Volume /Container	Preservative	Holding Time
Soil, Sediment or Sludge Samples - Low to Medium Concentrations			
Toxicity Characteristic Leaching Procedure (TCLP)	8-oz wide-mouth glass with Teflon®-lined lid closure	None	Extract 7 days, Analyze within 40 days
Nutrients, including: Nitrogen, Phosphorus, Chemical Oxygen Demand	8-oz wide-mouth glass with Teflon®-lined closure	None	ASAP
Other Inorganic Compounds	8-oz wide-mouth glass with Teflon®-lined closure	None	ASAP

Abbreviations:
- ASAP - as soon as possible
- NS - not specified
- P - Plastic
- G - Glass

Note: When no specific container type is listed (e.g., 8-oz. wide mouth glass jar), select a container appropriate to the volume and container requirements given. Samples for more than one parameter can be collected into a single container if container and preservation requirements are the same.

TABLE A-3
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR RADIOLOGICAL SAMPLES

WATER MATRIX

Parameter	Container	Preservative	Holding Time
Radiological tests[1]	12.0 L-plastic[2]	HNO3	6 mo
Tritium	125 ML glass	None	None

[1] For Radiological Testing, the specific analyses will be defined as some or all of the following: Gross Alpha, Gross Beta, Uranium 233+234, 235 and 238, Americium 241, Plutonium 239+240, Tritium, Strontium 90, 89, Cesium 137, Radium 226, 228.

[2] Full suite

TABLE A-4
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR RADIOLOGICAL SAMPLES

SOIL MATRIX

Parameter	Container	Preservative	Holding Time
Radiological tests[1] and Tritium	1-liter glass[2]	None	None

[1] For Radiological Testing, the specific analyses will be defined as some or all of the following: Gross Alpha, Gross Beta, Uranium 233+234, 235 and 238, Americium 241, Plutonium 239+240, Tritium, Strontium 90, 89, Cesium 137, Radium 226, 228.

[2] Full suite

EG&G ROCKY FLATS PLANT		Manual:	5-21000-OPS
~~EMD MANUAL OPERATION SOP~~ THIS IS		Procedure No.:	FO.14, Rev. 1
CONTROLLED DOCUMENT		Page:	1 of 11
		Effective Date:	August 30, 1991
Category EG&G — ROCKY FLATS PLANT		Organization:	Environmental Management
~~ENVIRONMENTAL MANAGEMENT DEPARTMENT~~			

This is a RED Stamp

TITLE:
FIELD DATA MANAGEMENT

Approved By: J. W. Langman 9/10/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

LIST OF APPENDIXES

"REVIEWED FOR CLASSIFICATION
By A. Keller (U)
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at the Rocky Flats Plant (RFP) to provide an orderly method by which field data will be recorded, entered into electronic form, validated, transferred, and filed. This applies to field data generated by any field-related sampling activities performed for the Rocky Flats Environmental Management (EM) Program. This procedure encompasses the data handling process from the point of data collection by field personnel to the filing and transmission of data to EG&G personnel.

This SOP describes hardware and software requirements, field data collection, data entry, data verification, data archiving, and filing that will be used for field data collection and documentation to attain acceptable standards of accuracy, precision, comparability, representativeness, and completeness.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

The designated subcontractor has the overall responsibility for implementing this SOP. The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for assuring that the procedures are followed by all subcontractor personnel.

The personnel responsible for maintaining the data in the data base will have, at a minimum, a two-year degree in Computer Science or 4 years relevant experience, a working knowledge of DOS, data bases, DBASE III and IV, Lotus 1-2-3, and personal computers. If personnel are used who do not have this background, appropriate training will be provided by the sub-contractor.

EG&G will be responsible for maintaining the RFEDS data base. EG&G will control all updates and fixes to the software. Any program updates will be provided to all subcontractors who are required to use the RFEDS data base.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Interim Final. October 1988.

RCRA Facility Investigation Guidance. (EPA). Interim Final. May 1989.

Rocky Flats Plant Environmental Restoration Program, Quality Control Plan. Rockwell International. January 1989.

The Environmental Survey Manual. DOE/EH-0053. Volumes 1-4. August 1987.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples
- SOP GT.1, Logging Alluvial and Bedrock Material
- SOP GT.2, Drilling and Sampling Using Hollow Stem Auger Techniques
- SOP GT.4, Rotary Drilling and Rock Coring
- SOP GT.7, Logging and Sampling of Test Pits and Trenches

- SOP GT.8, Surface Soil Sampling
- SOP GT.9, Soil Gas Sampling and Field Analysis
- SOP GW.1, Water Level Measurements in Wells and Piezometers
- SOP SW.4, Discharge Measurement
- SOP GW.6, Groundwater Sampling
- SOP SW.7, Collection of Tap Water Samples

5.0 PROCEDURES

This procedure is based primarily on the Rocky Flats Environmental Data System User's Manual and conversations held with representatives from EG&G.

5.1 HARDWARE AND SOFTWARE REQUIREMENTS

The purpose of this section is to define the minimum computer system required for the entry and transfer of the field data to EG&G.

- 80286 based micro computer
- 1 parallel port
- 5 1/4 high density disk drive or 3 1/2 high density disk drive
- 40 MB hard-disk drive
- EGA or VGA monitor and compatible drive
- 80-column printer
- 2 MB RAM memory
- Lotus 1-2-3
- DOS, version 3.31 or higher
- DBASE IV
- 60 MB backup tape drive

These requirements may be changed, when necessary, by RFP to comply with their available data transfer needs. RFP will inform all subcontractors of any necessary changes by way of a memo.

5.2 FIELD DATA COLLECTION

All data collected from the field will be recorded on preprinted forms. At a minimum, the sample number, site designation, and initials of the collector will be recorded on the form. To the extent possible, the format of the form will be in the same order as the electronic form in the data base. This will assist the field personnel in entering data into the data base with more efficiency and accuracy. Appendix FO.14A lists the RFEDS sample nomenclature convention to be used. See Section 7.0 for samples of the field data forms.

5.3 DATA RECEIPT AND COMPLETENESS CHECK

The purpose of the receipt and checking is to start the verification process by receiving and briefly reviewing the data. The preliminary verification will be conducted as soon as possible after receipt of the completed data forms. This task ensures that the forms are complete before entry into the data base.

- The field data form will be delivered to the designated staff person by the field personnel by the end of each day of field operations.

- The designated staff person receiving the form will initial and date the form upon receipt.

- Upon receipt, all forms will be checked for completeness. The Site Supervisor will be consulted to verify that all of the field forms have been received. At this time, any discrepancies will be discussed with the field personnel and clarified or completed immediately. Any changes to the field forms will be initialed and dated by the person making the changes.

- The following forms will be included with the field data package:

  - Field data transmittal form
  - Appropriate field data forms, depending on the sampling activity
  - Chain of Custody form(s)

5.4 TECHNICAL DATA VERIFICATION

When the data completeness has been verified, a technical verification will be performed on the data by a qualified verifier. This person will be able to technically review the data to ensure that the data are consistent with known chemical and physical properties of the media being sampled. For example, if the dissolved oxygen has a reading of 15, there is an indication of a problem since this is above the level of saturation. The verifier will check all calculations and reported units and all of the data on all of the forms. If the verifier detects an error in the data report sheet, the verifier must confer with the field sampler and the project manager prior to changing any information. Any change made must be reflected in the project manager's logbook.

5.5 DATA ENTRY

Once the field data have been reviewed and found to be complete, the data will be input to the Rocky Flats Environmental Data System (RFEDS) using the field data entry module.

Field tracking information will be entered simultaneously into the RFEDS Field Tracking Module provided by EG&G. This form tracks sample collection and shipping data, including:

- Sample number
- Sample location
- Bottle code and analyte group
- Shipper's initials
- Date sampled
- Date shipped
- Lab
- Chain of custody (COC) number

Note: The preceding data tracking information is documented on the COC form; therefore, the COC form can be used to facilitate data entry.

5.6 DATA VERIFICATION

This step ensures that the data recorded in the electronic data base are the same as the data recorded on the field data forms.

5.6.1 Field Data

When all of the data for the day have been entered into the data base, the data will be printed using the report option of the data base program. The reports (Forms FO.14B through J, see Section 7.0) will then be delivered along with the original field data forms to the designated data verification person. Under no circumstance will the data verifier be the same as the person who entered the data originally.

The original field data form and the printed report will be compared for accuracy. If transcription errors are found, the errors will be highlighted on the printed report and returned to the data entry person for corrections. Errors will be corrected and a new copy of the report will be generated at this time and the old copy destroyed. This process will be repeated until the printed reports match the field data forms. When the verification process is complete, the verifier will initial and date both the original field forms and the printed report.

5.6.2 Tracking Data

The sample tracking information will be entered into the RFEDS Field Tracking Module. When all tracking data has been entered, it will be printed and verified as described above.

When all of the appropriate data are entered into the RFEDS tracking form, it will be printed and given to the person responsible for verifying the data. This subtask will be done at the same time as the field data reports. Under no circumstance will the data verifier be the same as the person who entered the data originally.

When the verification process is complete, the printed form will be initialed and dated by the verifier.

5.7 DATA ARCHIVING AND FILING

Upon completion of the daily verification, a copy of RFEDS field data reports will be made. The initialed, dated reports will then be filed with the original field data forms. A copy of the initialed and dated computer printed report will be sent to EG&G in the weekly data package.

At the end of each week, when all field data for a given week has been verified, the RFEDS Field Module will be backed up onto tape. Then, an RFEDS export file on diskette will be created using the RFEDS file transfer option. This diskette will be labeled with the subcontractor company name, date of diskette, and the type of data it contains (e.g., well data, soil boring data, etc.). A RFEDS tracking data file on diskette containing verified field tracking data will also be created and labeled as described above. Use only 3½-inch double-sided, high-density diskettes for all diskettes to be sent to EG&G. Delivery of the diskettes will be on a schedule determined by EG&G.

The original data diskette containing the data base data, the tracking data diskette, and the diskette chain of custody, along with all of the original data base reports and the field data transmittal forms will be hand-delivered to the designated EG&G representative. A duplicate copy of these diskettes will be made at this time and filed with the original field data forms and the copies of the verified, initialed, and dated reports. A paper copy of the tracking data will be kept on file for quick reference.

The original data base data will remain on the hard disk in an archived form until removed by EG&G. This is the primary reason for copying the data to a diskette at the same time as the diskette is prepared for EG&G. The computer will be backed up weekly, using a tape drive just before the data disks are produced for EG&G. EG&G will determine the weekly delivery date. At least four weeks of backups will be maintained at any one time, and the tapes will be stored in a locked storage area.

5.8 SECURITY

The computers will be kept in a secure location and locked when not in use. The data base itself will utilize a password security system. The passwords required will be known only to the personnel who enter the data onsite, the onsite manager, and a representative of EG&G.

6.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data on field data forms, and verification observations in a data verification notebook. Field observations and data will be recorded with black waterproof ink on field data forms. Data verification observations will be recorded with black waterproof ink in a bound observation notebook with consecutively numbered pages. Documentation of the verification of the data base and the tracking data will be recorded and include the following data.

- Date of verification
- Initials of the verifier
- Date delivered to EG&G

The task manager will be responsible for ensuring that this documentation is completed.

See Section 7.0, Forms for examples of the data forms.

7.0 FORMS

The following data management forms are the current RFEDS requested field data as of August 1991. Data are collected in compliance with the related sampling SOP. Each SOP will include a copy of the appropriate data forms used during sampling.

The current RFEDS data base does not address all the parameters which are collected in the field. These additional parameters are in the field data sampling forms included in the cross-referenced SOPs.

Included within this SOP are the following RFEDS forms:

- Form FO.14A, Field Data Transmittal Form (RFEDS)
- Form FO.14B, Sample Collection Form
- Form FO.14C, Ground Water Sample Results Form
- Form FO.14D, Surface Soil Sample Form

- Form FO.14E, Sediment Sample Form
- Form FO.14F, Borehole SAample Form
- Form FO.14G, Surface Water Form
- Form FO.14H, Well Installation Form
- Form FO.14I, Biological Sampling Form
- Form FO.14J, Sample Tracking Form
- Form FO.14K, Groundwater Level Measurement Form
- Form FO.14L, Air Flow Tables Form

Forms FO.14B through L are "hard" copies (paper prints) of the computer screen accessed when entering data to RFEDS. Form FO.14B, Sample Collection Form must be completed (entered) in conjunction with Forms C, D, E, F, G, and H.

ROCKY FLATS ENVIRONMENTAL DATABASE SYSTEM (RFEDS)
FIELD DATA TRANSMITTAL FORM

DATA FOR THE WEEK OF ______________________ SUBCONTRACTOR ______________________

TYPE OF DATA

GROUNDWATER SAMPLING	☐	WELL INSTALLATION	☐
SURFACE SOIL SAMPLING	☐	BIOLOGICAL SAMPLING	☐
SEDIMENT SAMPLING	☐	SAMPLE TRACKING	☐
BOREHOLE SAMPLING	☐	GW LEVEL MEASUREMENT	☐
SURFACE WATER SAMPLING	☐	AIR FLOW TABLES	☐

TOTAL NUMBER OF FORMS ______________________

FIELD DATA VALIDATION AND VERIFICATION BY ______________________ DATE ______________

COMPUTER ENTRY AND VERIFICATION

DATA ENTERED BY ______________________ DATE ______________

VERIFICATION BY ______________________ DATE ______________

CORRECTIONS BY ______________________ DATE ______________

DISKETTE PREPARED BY ______________________ DATE ______________

DATA AND DISKETTE DELIVERY TO EG&G

RECEIVED BY ______________________ DATE ______________

FIELD DATA DELIVERABLE

SAMPLE NUMBER	LOCATION	DATE	SAMPLE NUMBER	LOCATION	DATE

FORM FO.14B

ENTER SAMPLE NUMBER:

Num

Sample Collection Form

```
Project Number:
Project Name  :
Sample Number :                          Type:

 Station Code     :                      Dry:    (Y/N)
 Collection Date  :   /  /           Quarter:
 Time             :   :
 Purpose          :
 QC Type          :
 QC Partner       :
 Volume Collected:               Units:
 Collection Technique:

    Sample Team Leader:
               Member:
               Member:
    Prepared By      :
          Press J for Jump to Tracking
               N for Next, D for Done, T to Edit This Form:   (N/D/T)
```

ROCKY FLATS ENVIRONMENTAL DATABASE SYSTEM (RFEDS)
FIELD DATA TRANSMITTAL FORM

DATA FOR THE WEEK OF ______________________ SUBCONTRACTOR ______________________

TYPE OF DATA

GROUNDWATER SAMPLING	☐	WELL INSTALLATION	☐
SURFACE SOIL SAMPLING	☐	BIOLOGICAL SAMPLING	☐
SEDIMENT SAMPLING	☐	SAMPLE TRACKING	☐
BOREHOLE SAMPLING	☐	GW LEVEL MEASUREMENT	☐
SURFACE WATER SAMPLING	☐	AIR FLOW TABLES	☐

TOTAL NUMBER OF FORMS ______________________

FIELD DATA VALIDATION AND VERIFICATION BY ______________________ DATE ______________________

COMPUTER ENTRY AND VERIFICATION

DATA ENTERED BY______________________ DATE ______________________
VERIFICATION BY______________________ DATE ______________________
CORRECTIONS BY ______________________ DATE ______________________
DISKETTE PREPARED BY ______________________ DATE ______________________

DATA AND DISKETTE DELIVERY TO EG&G

RECEIVED BY ______________________ DATE ______________________

FIELD DATA DELIVERABLE

SAMPLE NUMBER	LOCATION	DATE	SAMPLE NUMBER	LOCATION	DATE

FORM FO.14C

Num

Ground Water Sample Results Form

Project Number: Name:
Sample Number: Well Number:

Purge Volume :	Units :		
Purge Rate :	Units :		
Purging Method:	Depth to Water :	FT	

Field Analatical Parameters

Specific Conductance :	US/CM	pH :	
Conductivity :	Units:	Eh :	MV
Counductivity Temperature:		Color :	
Sample Temperature :		Odor :	
Dissolved Oxygen :	MG/L	Turbidity:	NTU
Headspace Reading :		Nitrate :	MG/L
Total Alkalinity :			
Comments :			

Press N for Next, P for Previous, D for Done, T to Edit This Form: (N/P/D/T)

FORM FO.14D

Num

Surface Soil Sample Form

Project Number: Name:
Sample Number :

Depth of take: Start End
in
in
in
in

Headspace Reading:
Comments :

Press N for Next, P for Previous, D for Done, T to Edit This Form: (N/P/D/T)

FORM FO.14E

Num
Sediment Sample Form

Project Number: Name:
Sample Number :

Depth of Water: FT
Depth of Take : INCHES
Comments :

Press N for Next, P for Previous, D for Done, T to Edit This Form: (N/P/D/T)

FORM FO.14F

Borehole Sample Form

Project Number: Name:
Sample Number :

Boring :
Rad Type: OVM Type: Equipment Number:

Start	End	Depth of Take Recovery	OVM	RAD	USCS Soil/Rock Type
FT	FT		PPM	CPM	
FT	FT		PPM	CPM	
FT	FT		PPM	CPM	
FT	FT		PPM	CPM	
FT	FT		PPM	CPM	

Gen OVM : Gen RAD:
Comments:

Press N for Next, P for Previous, D for Done, T for This Form: (N/P/D/T)

FORM FO.14G

ENTER DEPTH:

Num

Surface Water Form

Project Number:
Sample Number :
Name :
Depth:

Water Body Type:
Flow Rate :
Stream Width:
Flow Rate Method:
Total Depth :

Field Analytical Parameters

Air Temperature :		Units :	
Salinity :		Temperature :	
Saturation :		eH :	MV
Dissolved Oxygen :	PPM	pH :	
Chlorine :	PPM	End Point #1:	
Total Alkalinity :	MG/L	End Point #2:	
Specific Conductance:		End Point #3:	

Comments:

(Press: M to Add/Change at Another Depth, N for Next
P for Previous, D for Done, T to Edit This Form): (M/N/P/D/T)

Well Installation Form

Project Number:	Name:
Well Number :	Type:

```
Old Well No           :                          Date Completed:
Monitoring Interval:          To                  Well Status    :
Formation             :
Program               :
Depth to Bedrock      :       FT                  Total Depth:          FT
Top of Casing Stickup    :        FT          Completed Depth:          FT
Field Geologist          :
Drilling Contractor      :
Drilling Method          :
```

Boring :	Ground Elev:	Reference Elev:
North or Y:	East or X :	
Date : / /	Survey By :	
Well Type :	Grid X, Y : ,	Area:

Press N for Next, D for Done, T to Edit This Form: (N/D/T)

SCREEN TWO

Num

Well Installation Form

Project No :	Name :
Well Number :	Old Well:

Item	From	To	I.D.	Type
Protecive Casing	FT	FT	IN	
Surface Casing	FT	FT	IN	
Secondary Casing	FT	FT	IN	
Centralizer	FT	FT	IN	
Surface Seal	FT	FT		
Filter Pack	FT	FT		
Volume: CU FT				
Screen	FT	FT	IN	
Slot Size: IN				
Sump	FT	FT		
Backfill Seal	FT	FT		
Backfill	FT	FT		
Volume: CU FT				

Press N for Next, P for Previous, D for Done, T to Edit This Form: (N/P/D/T

FORM FO.141

Biological Sampling Data

Project Number: Name:
Sample Number : Sample Type:

Location Code: Area : Time : :
Location Desciption: Notebook #: Page #:
Accuracy ± : FT Grid X, Y : , 0

Sample Sub-Type : Aquatic/Terrestrial:
QA/QC Code : Lab ID :
Number of Containers: Container Volume :
Type of Container : Analytical Suite :
Tissue Type : Quarter :
Chain of Custody No.: Crew Leader :
Sample Purpose : Sample Weight :
Comments:

Initial Sample Date Final Sample Date Ship Date Sample Storage
/ / / / / /
Press D for Done, T to Edit This Form: (D/T)

FORM FO.14J

ENTER BOTTLE ID:

NumCaps
Sample Tracking Form

Project Number: Name: EMAD
Sample Number : Sample Type :
Bottle ID: Location Code:

Area : QA/QC Code :
Lab.ID : Number of Bottles:
Volume of Bottles: Shipping Manager :
Parameter : VOA-CLP
Chain of Custody :
Comments :

Init Date	Final Date	Ship Date
/ /	/ /	/ /

(Press: M to Add/Change Another Bottle ID, N for Next, R for Remove
P for Previous, D for Done, T to Edit This Form): (M/N/P/D/T)

GROUNDWATER LEVEL MEASUREMENT FIELD DATA COLLECTION FORM

WELL NUMBER	DATE	DEPTH TO WATER (FT)	MEASURED BY (UP TO 25 CHARS)	COMMENTS (UP TO 50 CHARS)

FORM FO.14L

RADIOACTIVE AMBIENT AIR

AIR FLOW TABLE

Project Number: Sample Number:	Project Name:
Temperature: Air Flow: Field Person:	New-Filter Time Pressure: Meter Reading: Notes:
Check-Filter Date: Temperature: Airflow: Field Person:	Time: Pressure: Meter Reading: Notes:
Change-Filter Date: Temperature: Airflow: Field Person:	Time: Pressure: Meter Reading: Notes:

F1 for help - F10 to commit (save) - F6 to clear block
F7 to query (search) - shift F6 to delete - shift F10 to ESC to exit/cancel
Char Mode: Replace Page 1

RFEDS SAMPLE NOMENCLATURE CONVENTION

A.1 RFEDS SAMPLE NUMBERS AND TYPES

The EG&G sample numbers consist of a sample prefix that relates to the type of sample that was collected, a 5 digit number and a two character code indicating the company that collected the sample. In addition, in the case of sampling done for the Operational Units, the company code is followed by a U and the number of the operational unit. No slashes, dashes or spaces are allowed and the sample number entered into the field module must exactly match the sample number on the chain of custody.

A.2 ADDITIONS TO THE SAMPLE NUMBER

For Matrix Spikes and Matrix Spike Duplicates (MS/MSD), add MS or MSD to the end of the sample number. When labs require that lab replicates be taken in the field, these need to be identified by the letters LR added to the end of the sample number. Do not use suffixes to indicate duplicates, rinsates, etc.

SAMPLE PREFIX		SAMPLE TYPE
BI	Biological Samples	BI
BH	Borehole Samples - drilling samples	SB
GW	Groundwater Samples	GW
FT	Field Treatability Samples	FT
NP	NPDES Program Samples	SW
SD	Surface Water Sediment Samples	SD
SS	Soil Samples	SS
SW	Surface Water Samples	SW
PW	Special Water Samples	PW
DR	Drum samples	DR
DW	Decon Pad Water Samples	DW
DS	Decon Pad Sediment Samples	DS

SAMPLE SUFFIXES	EXPLANATION
WC	Woodward-Clyde
ST	Stoller
EB	Ebasco
IT	International Technology

A.2.1 ADDITIONAL SAMPLE SUFFIXES FOR OPERATIONAL UNITS ONLY

SUFFIX	AREA	SUFFIX	AREA	SUFFIX	AREA
U1	OU1	U6	OU6	U11	OU11
U2	OU2	U7	OU7	U12	OU12
U3	OU3	U8	OU8	U13	OU13
U4	OU4	U9	OU9	U14	OU14
U5	OU5	U10	OU10	U15	OU15

EXAMPLE SAMPLE NUMBERS:

SW12345WC Surface water sample number 12345 collected by Woodward Clyde.

BHI2345EBU1 Borehole sample number 12345 collected by Ebasco as part of the OU1 investigation.

SSI2345STS Soil sample number 12345 collected by Stoller.

DW12345IT Decon Pad Water Sample 12345 by IT.

A.3 LOCATION CODES

A.3.1 BOREHOLES

00191 First three digits are the assigned numbers for a given Operational Unit, last two digits are the year the borehole was drilled. No spaces, slashes or dashes are allowed.

A.3.2 SURFACE WATER STATIONS

SW001 For every station except the ponds, the first two characters are always SW to indicate a surface water station. The last three numbers represent the station number. No spaces, slashes or dashes are allowed.

A4 Location codes for the pond water samples start with the pond designation followed by an abbreviation of the site where sample was taken. For example A4BG was taken at Pond A4 between the GAC filters. Those people taking pond samples will need to get an expanded list of pond sample locations from EMAD.

A.3.3 DECON PAD WATER TANKS

DW Location code for composite decon water tank samples.
DW1 Location code for Decon Pad Tank 1
DW2 Location code for Decon Pad Tank 2
DW3 Location code for Ocean Pad Tank 3
DW4 Location code for Decon Pad Tank 4
DW5 Location code for Decon Pad Tank 5

A.3.4 SEDIMENT STATIONS

SED001 Every sediment station has a prefix of BED followed by the number of the station. No spaces, slashes or dashes are allowed.

A.3.5 SOIL SAMPLES

No nomenclature system has yet been developed for the soil sampling location codes.

A.3.6 BIOLOGICAL SAMPLES

All biological locations will begin with the letters BI followed by 3 digits. Ebasco will have locations BIOO1 through BI200; Stoller will have BI201 through BI400. An example is shown below.

BI123 Biological Location 123

A.3.6 FIELD TREATABILITY STUDIES

FT001 All sites will have a prefix of FT followed by the number of the site. No spaces, slashes or dashes are allowed.

A.4 FIELD QA/QC CODES

CODE	EXPLANATION
RNS	Equipment Rinsate
REAL	Actual Sample (QC Partner)
DUP	Field Duplicate
TB	Trip Blank
FB	Field Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
LR	Lab Replicate

A.4.1 BOTTLE ID CODES

The following is a list of the bottle codes and the associated EPA analysis methods. These codes will be used for input into the RFEDS field tracking module.

METHOD CODES

CODE	DESCRIPTION		GRAASP
V	**CLP VOA PACKAGE**	**1.1**	**VOACLP**
VAR	VOA EPA METHOD 624 REGULATED LIST	1.2	VOA624
VAC	VOA EPA METHOD 624 COMPLETE LIST	1.3	VOA624
VBR	VOA EPA SW-846 METHOD 8240 REG. LIST	1.4	VOA8240
VBC	VOA EPA SW-846 METHOD 8240 COMP	1.5	VOA8240
VCR	VOA EPA METHOD 524.2 REGULATED LIST	1.6	VOA524.2

VCC	VGA EPA METHOD 524.4 COMPLETE LIST	1.7	VOA524.2
VDR	VOA EPA METHOD 502.2 REGULATED LIST	1.8	VOA502.2
VDC	VOA EPA METHOD 502.2 COMPLETE LIST	1.9	VOA502.2
VER	VOA EPA METHOD 601 REGULATED LIST	1.10	VOA601
VEC	VOA EPA METHOD 601 COMPLETE LIST	1.11	VOA601
VF	VOA EPA METHOD TO-14	1.12	VOATO-14
B	**SEMI-VOLS EPA CLP METHOD**	**1.13**	**BNACLP**
BAR	SEMI-VOLS EPA METHOD 625 REGULATED LIST	1.14	BNA625
BAC	SEMI-VOLS EPA METHOD 625 COMPLETE LIST	1.15	BNA625
BB	SEMI-VOLS EPA METHOD 625 BASE/NEUTRAL E	1.16	BNA625B
BCR	SEMI-VOLS EPA METHOD 1625 REGULATED L.	1.17	BNA1625
BCC	SEMI-VOLS EPA METHOD 1625 COMPLETE L.	1.18	BNA1625
BDR	SEMI-VOLS EPA METHOD 8270 REGULATED L.	1.19	BNA8270
BDC	SEMI-VOLS EPA METHOD 8270 COMPLETE L.	1.20	BNA8270
BER	SEMI-VOLS EPA METHOD 525 REGULATED L.	1.21	BNA525
BEC	SEMI-VOLS EPA METHOD 525 COMPLETE L.	1.22	BNA525
P	**PESTICIDES/PCB CLP METHOD**	**1.23**	**PESTCLP**
P	PCB CLP METHOD	1.23	PESTCLP
PAR	ORGANOCHLORINE PEST/PCB METHOD 608 REG.	1.24	PEST608
PAC	ORGANOCHLORINE PEST/PCB METHOD 608 COM.	1.25	PEST608

PBR	ORGANOCHLORINE PEST/PCB METHOD 505 REG.	1.26	PEST505
PBC	ORGANOCHLORINE PEST/PCB METHOD 505 COM.	1.27	PEST505
PCR	ORGANOCHLORINE PEST/PCB METHOD 8080 REG.	1.28	PEST8080
FCC	ORGANOCHLORINE PEST/PCB METHOD 8080 COM.	1.29	PEST8080
PD	PCBS ONLY, BY EPA METHOD 8080 COMPLETE	1.30	PCB8080C
PE	CHLORINATED HERBICIDES METHOD 615	1.31	CLHERB615
PF	ORGANOCHLORINE HERBICIDES METHOD	1.32	HERB8150
PGR	CHLORINATED HERBICIDES METHOD 508 REG.	1.33	HERB508
PGC	CHLORINATED HERBICIDES METHOD 508 COM.	1.34	HERB508
PH	TRIAZINE PESTICIDES METHOD 619	1.35	TRIPES619
PI	TRIAZINE PESTICIDES METHOD 507	1.36	TRIPES5O7
PJ	PEST/PCB/HERB BY LIQUID CHROMATOGRAPHY MASS SPECTROMETRY DETECTION	1.37	PESTMS
PK	PEST/PCB/HERB BY LIQUID CHROMATOGRAPHY FLUORESCENCE DETECTION	1.38	PESTLC
PL	NITROSO-AMINES EPA METHOD 607	1.39	NAPEST607
PM	POLYNUCLEAR AROMATIC HYDROCARBONS METHOD 610	1.40	PHPEST61O
PN	DIOXIN (2,3,7,8-TCDD) EPA METH 613	1.41	DPEST6I3
M	**METALS (STANDARD & ADDITIONAL) CLP**		**METCLP**
M*	**METALS (STANDARD & ADD.) CLP DISSOLVED**		**DMETCLP**
MA	METALS STANDARD CLP	1.42	SMETCLP
MA*	METALS STANDARD CLP DISSOLVED	1.42	DSMETCLP
MB	ADD. CLP METALS (CS,CR,LI,MO,SI,SR,SN)	1.43	METADD
MB*	ADD. CLP METALS (CS,CR,LI,MO,SI,SR,SN)	1.43	DMETADD

	METALS BY ATOMIC ADSORPTION		METCLPAA
	METALS BY ATOMIC ADSORPTION DISSOLVED		DMETCLPAA
W	STANDARD WATER QUALITY SUITE	1.44	WQPL
WA	TSS, TDS, CL, F, SO4, CO3, HCO3	1.44	WQPL
WBA	AMMONIA (NH4)	1.44	WQPL
WBB	TOTAL PHOSPHOROUS	1.44	WQPL
WBC	NITRATE/NITRITE as N (NO3/NO2 as N)	1.44	WQPL
WBD	TOTAL PHOSPHORUS & AMMONIA (NH4)	1.44	WQPL
WBE	NO3/NO2 as N, TOTAL PHOSPHOROUS & AMMONIA (NH4)	1.44	WQPL
WBF	NO3/NO2 as N, TOTAL PHOSPHOROUS	1.44	WQPL
WBG	NO3/NO2 as N, AMMONIA (NH4)	1.44	WQPL
WBH	NO3, AMMONIA (NH4)	1.44	WQPL
WC	OIL & GREASE	1.44	WQPL
WDA	O-PHOSPHATE	1.44	WQPL
WDB	NO2	1.44	WQPL
WDC	O-PHOSPHATE, NO2	1.44	WQPL
WE	CN	1.44	WQPL
WF	FECAL COLIFORMS, COLIFORM	1.50	WQPL
WG	COD	1.44	WQPL
WH	TOC	1.44	WQPL
WI	DOC	1.44	WQPL
WJ	SULFIDE AS H2S	1.44	WQPL
WK	CR6	1.44	WQPL
WL	pH and ALKALINITY	1.44	WQPL

WM	TOTAL KJELDAHL NITROGEN	1.44	WQPL
WN	BOD5, CBOD5	1.49	WQPL
WP	ACUTE TOXICITY TESTING	1.51	WQPL
WQ	BIOTA-OTHER	1.52	WQPL
R	TOTAL RADIONUCLEIDES (RA,RB,RC,RD,RE,RF,RG)		TRADS
R*	DISSOLVED RADIONUCLEIDES (RA,RB,RC,RD,RE,RF,RG)		DRADS
RA	GROSS ALPHA/BETA		TRADS
RA*	GROSS ALPHA/BETA DISSOLVED		DRADS
RB	PU239/240. AM241		TRADS
RB*	PU239/240, AN241 DISSOLVED		DRADS
RC	U233/234, U235, U238		TRADS
RC*	U233/234, U235, U238 DISSOLVED		DRADS
RD	SR89/90, CS137 (+CS134 WHEN BY GAMMA)		TRADS
RD*	SR89/90, CS137 DISS (+CS134 WHEN BY GAMMA)		DRADS
RE	RA226, RA228		TRADS
RE*	RA226, RA228 DISSOLVED		DRADS
RF	THORIUM 230/232, CM 244, NP 237		TRADS
RF*	THORIUM 230/232, CM 244, NP 237 DISSOLVED		DRADS
RG	TRITIUM		TRADS
RG*	TRITIUM DISSOLVED		DRADS
RH	RAD SCREEN		RS
RI	RA+RB+RC+RD (TYPICALLY SURFACE WATER)		TRADS
RI*	RA*+RB*+RC*+RD* (TYPICALLY SURFACE WATER)		DRADS
RJ	RA+RB+RC+RD+RG (TYPICALLY SEDIMENTS)		TRADS
RJ*	RA*+RB*+RC*+RD*+RG* (TYPICALLY SEDIMENTS)		DRADS
RK	RA+RC+RD+RE (TYPICALLY GROUNDWATER)		TRADS
RK*	RA*+RC*+RD*+RE*		DRADS

	(TYPICALLY GROUNDWATER)		
RL	RA+RB+RC+RD+RF (TYPICALLY MONTHLY PONDS)		TRADS
RL*	RA*+RB*+RC*+RD*+RF* (TYPICALLY MONTHLY PONDS)		DRADS
RM	RA+RC (TYPICALLY GROUNDWATER)		TRADS
RM*	RA*+RC* (TYPICALLY GROUNDWATER)		DRADS
RN	RB+RC (PU239/240,AN241,U233/234 , U235,U238)		TRADS
RN*	RB*+RC*(PU239/240,AN241,U233/234 ,U235,U238)		DRADS
RP	RD+RE (TYPICALLY GROUNDWATER)		TRADS
RP*	RD*+RE* (TYPICALLY GROUNDWATER)		DRADS
SA	OTHER SPECIAL ANALYSIS METHODS RADS		SPRAD
SB	OTHER SPECIAL ANALYSIS METHODS ORGANIC		SPORG
SC	OTHER SPECIAL ANALYSIS METHODS METALS		SPMET
SD	OTHER SPECIAL ANALYSIS METHODS WATER QUALITY		SPWQL
SE	OTHER SPECIAL ANALYSIS METHODS PEST/PCB		SPPPB
SF	EPA-TCLP GRANULATED ACTIVATED CARBON, FABRIC, PLASTICS REGULATED LIST	1.45	GACR
SG	EPA-TCLP GRANULATED ACTIVATED CARBON FABRIC, PLASTICS	1.46	GACC
SH	RCRA HAZ-WASTE CHAR. IGNITABILITY, CORROSIVITY, REACTIVITY, TOXICITY	1.47	ICRT
SI	SEQUENTIAL EXTRACTION OF TRACE ELEMENTS	1.48	OTHER

A.5 LIST OF RFEDS LAB CODES FOR ANALYTICAL LABS

LAB CODE	LABORATORY
123	123 LAB - ROCKY FLATS
881	881 LAB - ROCKY FLATS
ACCU	ACCULABS - WHEATRIDGE

ALPL	ALPHA LABS
ANAL	ANALYTICA
APPL	APPL LABS - FRESNO
ARNL	ARGONNE NATIONAL LABS
CHAD	CHADWICK
ECTC	ECO TEC
ITLC	IT LABS - CERRITOS
ITLK	IT LABS - KNOXVILLE/MIDDLEBROOK
ITLO	IT LABS - OAK RIDGE
ITPA	IT LABS - PITTSBURGH
ITLR	IT LABS - RICHLAND
NETL	NET LABS
RMAL	ROCKY MOUNTAIN ANALYTICAL - WHEAT RIDGE
RFWL	ROY F. WESTON ANALYTIC LAB - LIONVILLE
RFWS	ROY F. WESTON ANALYTIC LAB - STOCKTON
SAIR	SAIC LABS - ROCKVILLE .
SAIS	SAIC LABS - SAN DIEGO
TELI	TELEDYNE ISOTOPES
TMAE	TB LABS - EBERLINE
TMAN	TB LABS - NORCAL
TMAS	TB LABS - S&S
VIST	VISTA LABS - WHEATRIDGE
RFWG	WESTON-GULF COAST ANALYTICAL

PHOTOIONIZATION DETECTORS AND FLAME IONIZATION DETECTORS

EG&G-ROCKY FLATS PLANT	Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP	Procedure No.:	FO.15, Rev. 1
	Page:	1 of 6
	Effective Date:	August 30, 1991
Category 2	Organization:	Environmental Management

This is a CONTROLLED DOCUMENT

EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

TITLE:
PHOTOIONIZATION DETECTORS (PIDs) AND FLAME IONIZATION DETECTORS (FIDs)

Approved By:

J. W. Langman 9/10/91

(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

LIST OF APPENDIXES

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats to define the standard operating procedure for the use of flame ionization detectors (FID) and photoionization detectors (PID) in the field. FIDs and PIDs are used to detect and measure volatile organic compounds. An FID or PID is typically calibrated to measure the concentration of a known calibration gas. The instrument can detect other volatile organic compounds, but the concentration indicated will not be accurate. Therefore, these instruments are typically used in the field to screen samples or to monitor the environment for health and safety purposes. They will not be used at Rocky Flats Plant (RFP) for the purpose of obtaining analytical chemistry data.

3.0 QUALIFICATIONS

Only qualified personnel will be allowed to perform measurements with FIDs and/or PIDs. The subcontractor's Site Safety Officer will determine who is qualified based on experience and demonstrated competence. Those qualified will use FIDs and PIDs in accordance with this SOP and the manufacturer's written instructions.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Interim Final. EPA/540/G-89/004. October 1988.

RCRA Facility Investigation Guidance. Interim Final. EPA. May 1989.

RCRA Groundwater Monitoring Technical Enforcement Guidance Document. EPA OSWER.9950.1. September 1986.

Rockwell International. Rocky Flats Plant Environmental Restoration Program Quality Assurance/Quality Control Plan. January 1989.

The Environmental Survey Manual. DOE/EH-0053. Volumes 1-4. 1987.

5.0 FID EQUIPMENT AND PROCEDURES

5.1 DESCRIPTION AND THEORY

A FID uses ionization as the detection method, in which the ionization is caused by a hydrogen flame, rather than an ultraviolet (UV) light, as in a PID. The flame has sufficient energy to ionize any organic chemical species with an ionization potential (IP) of 15.4 or less.

Inside the detector chamber, the sample is exposed to a hydrogen flame, which ionizes the organic vapors. When most organic vapors burn, positively charged carbon-containing ions are produced, which are collected by a negatively charged collecting electrode in the chamber. As the positive ions are collected, a current proportional to the hydrocarbon concentration is generated on the input electrode. This current is measured with a preamplifier that has an output signal proportional to the ionization current.

An FID consists of a probe, a pumping system, a particle filter, a hydrogen gas container, a scrubber, a burning chamber, an electrical detection and amplification system, and a read-out device (meter).

FIDs must be calibrated, used, and maintained in accordance with the manufacturer's instructions for each specific instrument. See Appendix FO.15A for an example of some instructions for a specific instrument.

6.0 PID EQUIPMENT AND PROCEDURES

6.1 DESCRIPTION AND THEORY

A PID operates on the principle of photoionization. When a photon of UV radiation strikes a chemical compound, it ionizes a molecule of the compound if the radiation is equal to or greater than the ionization potential (IP) of the compound. Because ions are capable of conducting an electrical current, an electron flow can be generated within the instrument.

In a PID, an electrical pump or fan moves the gas being sampled past a UV source. The sample is ionized and ion pair production occurs for each molecule ionized. The free electrons produce a current directly proportional to the number of ions produced. The current is amplified, detected, and displayed on a meter. Chemical species having IPs less than or equal to the lamp rating will generate an appropriate instrument response. Chemical species that have IPs greater than the lamp rating will display a poor instrument response or no response at all.

Employing an 11.7 electron volt (eV) rated lamp would provide a relatively wide range of detectable species; however, that lamp requires frequent replacement. More commonly, a 10.2-eV lamp is used. A 10.2-eV lamp offers relatively high radiation levels without frequent lamp replacement and will detect many species, with the notable exception of chlorinated aliphatics.

PIDs must be used, calibrated, and maintained in accordance with the manufacturer's instructions for each specific instrument. The PID consists of a probe, readout assembly, and a battery charger. The probe contains the sensing and amplifying circuitry, the readout assembly contains the meter controls, and the power supply is a rechargeable battery. There are numerous models of PIDs available (see Appendix FO.15B for example information on one specific instrument).

7.0 DECONTAMINATION

PIDs and FIDs will be placed in plastic bags with the sensing probe protruding through the bag prior to use in the field to reduce the potential for gross contamination. The bag will be fastened in such a way as to allow viewing of the meter readout and access to instrument controls. Bags should be discarded during decontamination at the end of the workshift. The external surfaces of the PIDs and FIDs should be wiped with Kim-wipe or a similar material prior to its return to the equipment manager. Equipment should be decontaminated in accordance with SOP FO.3, General Equipment Decontamination.

8.0 QUALITY ASSURANCE/QUALITY CONTROL

Daily calibration and operational checks are required to ensure that the instrument is functioning properly. Manufacturer's calibration instructions must be accomplished prior to daily use, and calibration must be confirmed at the end of each day.

PIDs and FIDs will be checked periodically during use to ensure that they are responding to contaminants. A Magic Marker® used as a source of volatile gas works well to demonstrate that the instrument is responding.

The manufacturer's operating manual will be used for the operation, calibration, maintenance, and care of FIDs and PIDs. The manual will be present on site at all times.

9.0 DOCUMENTATION

Use of PIDs and FIDs will be in accordance with the Health and Safety Plan or SOPs requiring its use. Observations or calculations will be documented by personnel in a bound, water-proof field notebook. Observations that need to be documented will be entered into the site manager's daily logbook. Entries will be signed and dated by field personnel making the entries. Form FO.15A, Calibration Record, will be used to document daily calibrations. The Calibration Record asks for the following information:

- Date/Time.
- Initial Response - Initial Response is the first meter reading obtained with calibration gas to either adjust instrument or note how far off the instrument is drifing depending on whether an HNu or Thermal Environmental is used.
- Alarm Setting.
- Calibration Sequence Initiated - Cal sequence is a feature specific to the Thermal Environmental System Model 580B. Calibration must be done twice on Model 580B in order to store in memory. If only done once, the calibration is not stored in memory.
- Results.
- Cailbrator's Name.

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.15A

CALIBRATION RECORD

INSTRUMENT:

MODEL:

CALIBRATION GAS USED:

SUBCONTRACTOR:

INSTRUMENT: SERIAL NUMBER:

Date/Time	Initial Response	Alarm Setting	Cal. Sequence Initiated - Y/N	Results (Pass/Fail)	Calibrator's Name

(4011-454-39) (FORM1.15A) (02/12/91)

APPENDIX FO.15A

Foxboro OVA-128

APPENDIX A

The following appendix provides information pertaining to the Foxboro OVA-128.

A.1 LIMITATIONS

- The OVA will not detect inorganics.
- The OVA will detect methane, which is explosive but relatively nontoxic.
- Current DOT shipping regulations (Title 49CFR) must be researched before shipping an OVA containing pressurized hydrogen to determine proper shipping name, DOT index number, proper shipping container, packaging, labeling, restrictions, and placarding requirements.
- A relative humidity greater than 95 percent will cause inaccurate and unstable responses.
- A temperature less than 40°F will cause slow and poor response.
- Actual contaminant concentrations are measured relative to the calibration gas used. Therefore, specific contaminants and their quantities cannot easily be identified.
- The OVA responds differently to different compounds. Table A-1 is a list, provided by the manufacturer, of the relative sensitivities of the OVA to some common organic compounds. Since the instrument is factory calibrated to methane, all relative responses are given in percent, with methane at 100.

TABLE A-1

RELATIVE RESPONSE SENSITIVITY FOR OVA

Chemical Compound	Instrument Indication in Percent of Actual Level
Methane	100
Ethane	90
Propane	64
N-butane	61
N-pentane	100
Ethylene	85
Acetylene	200
Benzene	150
Toluene	120
Acetone	100
Methyl ethyl ketone	80
Methyl isobutyl ketone	100
Methanol	15
Ethanol	25
Isopropyl alcohol	65
Carbon tetrachloride	10
Chloroform	70
Trichloroethylene	72
Vinyl chloride	35

A.2 MAINTENANCE AND CALIBRATION RESPONSIBILITIES

It is preferable to minimize the number of people responsible for maintenance and calibration of the OVA. These people shall also be responsible for logging the equipment in and out. Documentation of instrument user, dates of use, instrument identification number, maintenance and calibration procedures, and project identification shall be maintained.

A.3 SPECIFIC PROCEDURES

A.3.1 Startup Procedures

- Connect the probe/readout connectors to the side-pack assembly.
- Check the battery condition and hydrogen supply.
- For measurements taken as methane-equivalent, check that the GAS SELECT dial is set at 300.
- Turn the electronics on by moving the INST switch to the ON position, and allow 5 minutes for warm-up.
- Set the CALIBRATE switch to X10; use the CALIBRATE knob to set the indicator at 0.
- Open the H_2 tank valve and the H_2 supply valve completely. Check that the hydrogen supply gauge reads between 8.0 and 12.0 psig.
- Turn the PUMP switch to ON.
- Check that the BACKFLUSH and INJECT valves are in the UP position.

- To light the flame, depress the igniter switch until a meter deflection is observed. The igniter switch may be depressed for up to 5 seconds. Do not depress the switch for longer than 5 seconds, as it may burn out the igniter coil. If the instrument does not light, allow the instrument to run several minutes and then repeat the ignition attempt.

- Confirm an OVA operational state by using an organic source, such as a Magic Marker®. Any meter deflection will indicate that the OVA is operating.

- Establish a background level in a clean area or by using the charcoal scrubber attachment to the probe (depress the sample inject valve), recording background measurements for reference.

- Set the alarm level, if desired.

A.3.2 Shutdown Procedure

- Close the H_2 supply valve and H_2 tank valve (do not overtighten the valves).

- Turn the INST switch to OFF.

- Wait until the H_2 supply gauge indicates that the system is purged of H_2 (approximately 10 seconds); then switch off the pump.

- Put the instrument on an electrical charger at completion of day's activities.

A.3.3 Maintenance and Calibration Schedule

Function	Frequency
Check particle filters	Weekly or as needed
Check quad rings	Monthly or as needed
Clean burner chamber	Monthly or as needed
Check secondary calibration	Prior to project startup
Check primary calibration	Monthly, or if secondary calibration is off by more than ±10 percent
Check pumping system	Before project startup
Replace charcoal in scrubber attachment	120 hours of use, or when background readings in a clean environment are higher with the inject valve down than with the inject valve up
Factory service	At least annually

Note: Instruments that are not in service for extended periods of time need not meet the above schedule. However, they must be given a complete checkout before their use, addressing the maintenance items listed above.

A.3.4 Calibration Procedures

A.3.4.1 Primary Calibration.

- Remove the instrument components from the instrument shell.

- Turn on ELECTRONICS and ZERO INSTRUMENT on the X10 scale. Set the gas-select dial to 300.

- Turn on PUMP and HYDROGEN. Ignite the flame. Go to SURVEY MODE.

- Introduce a methane standard near 100 parts per million (ppm).

- Adjust R-32 Trimpot on the circuit board to make the meter read to standard.

- Turn off the hydrogen flame, and adjust the meter needle to read 40 ppm (calibrate @ X10) using the calibration adjust knob.

- Switch to X100 scale. The meter should indicate 0.4 on the 1 to 10 meter markings (0.4 x 100 = 40 ppm). If the reading is off, adjust with R33 Trimpot.

- Return to X100 scale and adjust the needle to 40 ppm with calibration; adjust the knob, if necessary.

- At the X10 scale, adjust the meter to read 0.4 on the 1-to-10 meter markings using the calibration adjust. Switch to the X1 scale. The meter should read 4 ppm. If the reading is off, adjust using the R31 Trimpot.

A.3.4.2 Secondary Calibration.

- Fill an air sampling bag with 100 ppm (certified) methane calibration gas.
- Connect the outlet of the air-sampling bag to the air-sampling line of the OVA.
- Record the reading obtained from the meter on the calibration record.

A.3.4.3 Documentation

All field calibrations will be documented on the calibration record form, Attachment 1.15A (see Section II).

- Instrument calibrated (I.D. or serial number)
- Date of calibration
- Results of the calibration
- Identification of person who calibrated the instrument
- Identification of the calibration gas (source, type, concentration, lot number)

A.3.4.4 Pump System Checkout.

- With the pump on, hold the unit upright and observe the flow gauge.
- See if the ball level is significantly below a reading of 2; if so, flow is inadequate.
- Check connections at the sample hose.
- Clean or replace particle filters if the flow is impaired or if it is time for scheduled service.
- Reassemble and retest flow.
- If the flow is still inadequate, replace the pump diaphragm and valves.
- If flow is normal, plug the air intake. The pump should slow and stop.
- If there is no noticeable change in the pump, tighten the fittings and retest.
- If there is still no change, replace the pump diaphragm and valves.
- Document this function in the maintenance records.

A.3.4.5 Burner Chamber Cleaning.

- Remove the plastic exhaust port cover.
- Unscrew the exhaust port.
- Use a wire brush to clean the burner tip and electrode. Use a wooden stick to clean the Teflon surfaces.
- Brush the inside of the exhaust port.
- Blow out the chamber with a gentle air flow.
- Reassemble and test the unit.
- Document this function in the maintenance records.

A.3.4.6 Quad Ring Service.

- Remove OVA instruments from their protective shell.
- Remove the clip ring from the bottom of the valve.
- Unscrew the nut from the top of the valve.
- Gently pull the valve shaft upward and free it of its housing.
- Examine the rings for signs of damage; replace them as necessary.
- Lightly grease the rings with silicone grease.
- Reassemble the valve; do not pinch the rings during shaft insertion.
- Document this function in the maintenance records.

A.3.4.7 Troubleshooting.

Indication	Possible Cause
High background reading (More than 10 ppm)	Contaminated hydrogen Contaminated sample line
Continual flameout	Hydrogen leak Dirty burner chamber Dirty air filter
Low air flow	Dirty air filter Pump malfunction Line obstruction

Flame will not light	Low battery Igniter broken Hydrogen leak Dirty burner chamber Air flow restricted
No power to pump	Low battery Short circuit
Hydrogen leak (instrument not in use)	Leak in regulator Leak in valves

A.3.4.8 Hydrogen Recharging.

- High-grade hydrogen (99.999 percent) is required. Maximum pressure the instrument can handle is 2,300 psig.
- Connect the fill hose to the REFILL FITTING on the side pack assembly with the FILL/BLEED valve in the OFF position.
- Open the H_2 SUPPLY BOTTLE valve.
- Place the FILL/BLEED valve on the fill hose in the BLEED position MOMENTARILY to purge any air out of the system.
- Open the instrument TANK valve.
- Open the REFILL valve on the instrument.
- Place the FILL/BLEED valve in the FILL position until the instrument pressure gauge equalizes with the H_2 SUPPLY BOTTLE pressure gauge.
- Shut the REFILL valve, FILL/BLEED valve, and H_2 SUPPLY BOTTLE valve, in quick succession.
- Turn the FILL/BLEED valve to BLEED until the hose pressure equalizes to atmospheric pressure.
- Turn the FILL/BLEED valve to the FILL position; then turn the valve to the BLEED position; then turn to the OFF position.
- Close the TANK on the instrument.
- Disconnect the FILL HOSE and replace the protective nut on the REFILL FITTING.

A3.4.9 Particle Filter Servicing.

Filters have been placed at two points in the air sampling line of the OVA to keep particulates from entering the instrument. The first filter is located in the probe assembly, and the second filter (primary filter) is located on the side pack assembly. Cleaning procedures are as follows:

- Detach the probe assembly from the readout.
- Disassemble the probe (unscrew the components).
- Clean the particle filter located within the probe by blowing air through the filter.
- Reassemble the probe.
- Gain access to the primary filter, located behind the sample inlet connector on the side pack assembly, by removing the sample inlet connector with a thin-walled, 7/16-inch socket wrench. Remove the filter, and clean it as above.
- Reassemble the sample inlet fitting and filter to the side pack assembly.
- Check the sample flowrate.

Note: The manufacturer's operating instruction and calibration manual for the specific model of flame ionization detector must be used.

APPENDIX FO.15B

HNU Systems P1-101

APPENDIX B

B.1 THE HNU SYSTEMS P1-101 PHOTOIONIZATION DETECTOR (HNU)

The HNU is a portable, nonspecific, vapor/gas detector employing the principle of photoionization to detect a variety of chemical compounds, both organic and inorganic.

The HNU contains an UV light source within its sensor chamber. Ambient air is drawn into the chamber with the aid of a small fan. If the IP of any molecule present in the ambient is equal to or lower than the energy of the UV light source, ionization will take place, causing a deflection in the meter. Response time is approximately 90 percent at 3 seconds. The meter reading is expressed in parts per million (ppm). All readings must be stated as equivalent readings that depend on the calibration gas being used. For example, the standard gas used to calibrate the HNU is benzene, which allows the instrument to provide results in benzene equivalence. Table B-1, modified from the "Instruction Manual for Model PI-101 Photoionization Analyzer" (HNU Systems, Inc., 1975), lists the relative sensitivities for various gases.

B.2 LIMITATIONS

- If the IP of a chemical contaminant is greater than the UV light source, this chemical will not be detected.
- It should be noted, specifically, that the HNU will not detect methane.
- During cold weather, condensation may form on the UV light source window, resulting in erroneous results.
- Instrument readings can be affected by humidity and powerlines, making it difficult to interpret readings.
- Total concentrations are relative to the calibration gas used. Therefore, actual contaminant species and their quantities cannot be identified. Also, while the

instrument scale reads 0 to 2,000 ppm, response is linear to benzene, for example, only from 0 to about 600 ppm. Greater concentrations may be "read" at a higher or lower level than the true value.

TABLE B-1
RELATIVE HNU PHOTOIONIZATION SENSITIVITIES FOR VARIOUS GASES
(10.2 eV Lamp)

Species	Photoionization Sensitivity*
P-xylene	11.4
M-xylene	11.2
Benzene	10.0 (reference standard)
Toluene	10.0
Diethyl sulfide	10.0
Diethyl amine	9.9
Styrene	9.7
Trichloroethylene	8.9
Carbon disulfide	7.1
Isobutylene	7.0
Acetone	6.3
Tetrahydrofuran	6.0
Methyl ethyl ketone	5.7
Methyl isobutyl ketone	5.7
Cyclohexanone	5.1
Naptha (86% aromatics)	5.0
Vinyl chloride	5.0
Methyl isocyanate	4.5
Iodine	4.5
Methyl mercaptan	4.3
Dimethyl sulfide	4.3
Allyl alcohol	4.2
Propylene	4.0
Mineral spirits	4.0
2,3-Dichloropropene	4.0

TABLE B-1 (continued)
RELATIVE HNU PHOTOIONIZATION SENSITIVITIES FOR VARIOUS GASES
(10.2 eV Lamp)

Species	Photoionization Sensitivity*
Cyclohexene	3.4
Crotonaldehyde	3.1
Acrolein	3.1
Pyridine	3.0
Hydrogen sulfide	2.8
Ethylene dibromide	2.7
N-octane	2.5
Acetaldehyde Oxime	2.3
Hexane	2.2
Phosphine	2.0
Heptane	1.7
Allyl chloride (3-chloropropene)	1.5
Ethylene	1.0
Elylene oxide	1.0
Acetic anhydride	1.0
Alpha pinena	0.7
Dibromochloropropane	0.7
Epichlorohydrin	0.7
Nitric oxide	0.6
Beta pinene	0.5
Citral	0.5
Ammonia	0.3
Acetic Acid	0.1
Nitrogen dioxide	0.02
Methane	0.0
Acetylene	0.0
Ethylene	0.0

* Expressed in ppm (v/v)

Source: Instruction Manual for Mode PI-101
Photoionization Analyzer, HNU Systems, Inc., 1975

- Wind speeds of greater than 3 miles an hour may affect fan speed and readings, depending on the position of the probe relative to wind direction.

B.3 MAINTENANCE AND CALIBRATION

The instrument user is responsible for properly calibrating and operating the instrument. When the instrument is scheduled for or requires maintenance, these functions should be conducted only by qualified individuals. If possible, maintenance responsibilities should be restricted to one or two individuals who will also bear responsibilities for logging the equipment in and out. Documentation of instrument user, dates of use, instrument identification number, maintenance and calibration functions, and project identification shall be maintained.

B.4 SPECIFIC PROCEDURES

B.4.1 *Startup Procedures*

- Check the FUNCTION switch on the control panel to make sure it is in the OFF position. Attach the probe to the readout unit. Match the alignment key, and twist the connector clockwise until a distinct locking is felt.

- Turn the FUNCTION switch to the BATTERY CHECK position. Check that the indicator reads within or beyond the green battery arc on the scale plate. If the indicator is below the green arc, or if the red LED comes on, the battery must be charged before using.

- To zero the instrument, turn the FUNCTION switch to the STANDBY position and rotate the ZERO POTENTIOMETER until the meter reads zero. Wait 15 to 20 seconds to confirm that the zero adjustment is stable. If it is not, then readjust.

Check to see that the SPAN POTENTIOMETER is set at the appropriate setting for the probe being used (5.0 for 9.5 eV probe, 9.8 for 10.2 eV, and 5.0 for 11.7 eV).

- Set the FUNCTION switch to the desired ppm range. A violet glow from the UV lamp source should be observable at the sample inlet of the probe/sensor unit. (Do not look directly at the glow, since eye damage could result.)

- Listen for the fan operation to verify fan function.

- Check instrument with an organic point source, such as a Magic Marker®, to certify instrument function. A meter reading should be observed.

- The unit will operate for approximately 8 to 10 hours on full charge.

B.4.2 Shutdown Procedures

- Turn the FUNCTION switch to the OFF position.
- Disconnect the probe connector.
- Place the instrument on the charger.

B.4.3 Periodic Instrument Response Checks

The HNU should periodically be exposed to the solvents in a Magic Marker® to verify that the PID is responding. These "response checks" are key to providing confidence to the user that the instrument is functioning and responding to contaminants.

B.4.4 Maintenance and Calibration Schedule

Function	Frequency
Perform routine calibration	Prior to each use (During extended field use, the HNU PI-101 must be calibrated at least once a day.)
Factory checkout and calibration	Yearly or when malfunctioning or after changing UV light source
Wipe down readout unit	After each use

Clean UV light source window	Every month or as use and site conditions dictate
Clean the ionization chamber	Monthly
Recharge battery	After each use

B.4.5 Cleaning the UV Light-Source Window

- Turn the FUNCTION switch to the OFF position, and disconnect the sensor/probe from the Readout/Control unit.

- Remove the exhaust screw located near the base of the probe. Grasp the end cap in one hand and the probe shell in the other. Separate the end cap and lamp housing from the shell.

- Loosen the screws on the top of the end cap, and separate the end cap and ion chamber from the lamp and lamp housing, taking care that the lamp does not fall out the lamp housing.

- Tilt the lamp housing with one hand over the opening so that the lamp slides out of the housing into your hand.

- The lamp window may be cleaned using lens paper with any of the following compounds:
  - Use HNU Cleaning Compound on all lamps except the 11.7 eV lamp.
  - Clean the 11.7 eV lamp with a freon or chlorinated organic solvent. Do not use HNU cleaner, water, or water miscible solvents (i.e., acetone and methanol).

- Following cleaning, reassemble the unit by first sliding the lamp back into the lamp housing. Place the ion chamber on top of the housing, making sure the contacts are properly aligned.

- Place the end cap on top of the ion chamber, and replace the two crews. Tighten the screws only enough to seal the O-ring. Do not overtighten.

- Line up the pins on the base of the lamp housing with pins inside the probe shell, and slide the housing assembly into the shell. It will fit only one way.

- Replace the exhaust screw.

B.4.6 Cleaning the Ionization Chamber

- Turn the FUNCTION switch to the OFF position and disconnect the sensor/probe from the Readout/control unit.

- Remove the exhaust screws located near the base of the probes. Grasp the end cap in one hand and the probe shell in the other. Separate the end cap and lamp housing from the shell.

- Loosen the screws on the top of the end cap and separate the end cap and ion chamber from the lamp and lamp housing, taking care that the lamp does not fall out of the lamp housing.

- The ion chamber may be cleaned according to the following sequence:
  - Clean with methanol using a Q-tip.
  - Allow to dry.

- Place the ion chamber on top of the housing, making sure the contacts are properly aligned.

- Place the end cap on top of the ion chamber and replace the two screws. Tighten the screws only enough to seal the O-ring. Do not overtighten.

- Line up the pins on the base of the lamp housing with pins inside the probe shell and slide the housing assembly into the shell. It will fit only one way.

B.4.7 Troubleshooting

- The meter does not respond in any switch position (including BATT CHK):
  - Meter movement is broken. Tip the instrument rapidly form side to side: The meter needle should move freely and return to zero.

- Electrical connection to meter is broken.
  - (a) Check all wires leading to meter.
  - (b) Clean the contacts of quick-disconnects.
- Battery is completely dead
  - (a) Disconnect battery.
  - (b) Check voltage with a volt-ohm meter.
- Check the fuse.

- If none of the above solves the problem, consult the factory.

- Meter responds in BATT CHK position, but reads zero or near zero for all others.
  - Power supply is defective. Check power supply voltages as shown in the HNU *Instruction Manual*. If any voltage is out of specification, consult the factory.
  - Input transistor or amplifier has failed.
    - (a) Rotate the zero control; the meter should deflect up or down as control is turned.
    - (b) Open the probe, Both transistors should be fully sealed in sockets.
  - Input signal connection is broken in probe or readout.
    - (a) Check the input connector on the printed circuit board. The input connector should be firmly pressed down.
    - (b) Check components on back of printed circuit board. All connections should be solid, and no wires should touch any other object.
    - (c) Check all wires in the readout for solid connections.

- Instrument responds correctly in BATT CHK and STBY but not in measuring mode.
  - Check to see that the light source is on. Do not look directly at the UV light source, as eye damage could result.
  - Check the high-voltage power supply.
  - Open the end of probe, remove the lamp, and check the high voltage on the lamp ring with a volt-ohm meter.
  - If high voltage is present at all above points, the light source has probably failed. Consult the factory.

- Instrument responds correctly in all positions, but the signal is lower than expected.

- Check the span setting for the correct value.
- Clean the window of the light source.
- Double check the preparation of standards.
- Check the power supply 180 V output.
- Check for proper fan operation. Check the fan voltage.
- Rotate the span setting. Response should change if the span potentiometer is working properly.

- Instrument responds in all switch positions but is noisy (erratic meter movement).
  - Open the circuit in the feedback circuit. Consult the factory.
  - Open the circuit in the cable shield or probe shield. Consult the factory.

- Instrument response is slow and/or nonreproducible.
  - The fan is operating improperly. Check the fan voltage.
  - Check the calibration and operation.

- The battery indicator is low.
  - Indicator comes on if battery charge is low.
  - Indicator also comes on if ionization voltage is too high.

NOTE: The manufacturer's operating instruction for the specific model of photoionization detector must be used.

OVAs are non-destructive analyzers, so the sampled species is also discharged intact to ambient air. Calibrations using isobutylene can be done in room air due to isobutylene's non-toxic properties.

B.4.8 Calibration Procedure No. 1

For HNU calibration canisters without regulators:

- Run through the startup procedures.

- Fill a sampling bag with HNU calibration gas of known contents.

- Connect the HNU probe to the sampling bag by using flexible tubing.

- Allow the sample bag contents to be drawn into the probe, and check the response in ppm.

- Adjust the span potentiometer to produce the concentration listed on the span gas cylinder. This procedure shall be followed only until the span potentiometer reaches the following limits:

Probe	Initial Span Pot. Setting	Maximum Acceptance Span Pot. Setting
9.5 eV	5.0	1.0
10.2 eV	9.8	8.5
11.7 eV	5.0	2.0

If these limits are exceeded, the instruments must be returned for maintenance and recalibration.

Each responsible organization must develop a mechanism for the documentation of calibration results. This documentation includes the following:

- Date inspected
- Person who calibrated the instrument
- The instrument number (serial number or other ID number)
- The results of the calibration (ppm, probe eV, span potentiometer setting)
- Identification of the calibration gas (source, type, concentration)

B.4.9 Calibration Procedure No. 2

For HNU calibration canisters equipped with a regulator:

- Run through the startup procedures.

- Connect one end of a sampling hose to the regulator outlet and the other end to the sampling probe of the HNU.

- Crack the regulator valve.

- Take a reading after 5 to 10 seconds.

- Adjust the span potentiometer.

All field calibrations will be documented on the calibration record form (Form 1.15A, Section 11).

EG&G ROCKY FLATS PLANT		Manual:	5-21000-OPS
~~EMD MANUAL~~ OPERATION SOP		Procedure No.:	FO.16, Rev. 1
		Page:	1 of 16
		Effective Date:	August 30, 1991
Category 2		Organization:	Environmental Management

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

TITLE:
FIELD RADIOLOGICAL MEASUREMENTS

Approved: J. W. Langman 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

FIGURES

2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures and specifies who will conduct those procedures at the Rocky Flats Plant (RFP) to gather radiological data for monitoring environmental materials, samples, and equipment during field activities involving sediments conducted under the Environmental Management (EM) Program. In particular, this SOP describes monitoring for the presence of radioisotopes. This SOP does not describe procedures for predicting or assessing personnel exposures to radioisotopes.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Radiological Engineering-approved contractor Health and Safety Specialists will conduct radiation monitoring activities for equipment, samples, and personnel before they leave potentially contaminated work areas. EG&G will establish the qualifications for Radiological Engineering-approved contractor Health and Safety Specialists and ensure that all are fully qualified.

Subcontractor personnel will conduct radiation monitoring activities within the work area for the purpose of handling environmental materials. All subcontractor personnel assigned to conduct monitoring activities will have attended the three-day EG&G radiation worker safety course and will be familiar with the contents of this SOP and the applicable manufacturer's instructions for any radiological monitoring instrument they use. The subcontractor will maintain documentation of training at the work site.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

Nuclear Weapon Accident Response Procedures (NARP) Manual. July 2, 1984. The Defense Nuclear Agency.

Radiological Operating Instruction 3.1. Performance Of Surface Contamination Surveys. August 9, 1989. Rocky Flats Plant Department of Health, Safety, and Environment.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.4, Heavy Equipment Decontamination
- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.8, Handling of Drilling Fluids and Cuttings
- SOP FO.10, Receiving, Labeling, And Handling Environmental Materials Containers

5.0 EQUIPMENT

The following monitoring devices and supplies or equivalent items will be required for each subcontractor to complete the monitoring activities described by this SOP. The responsible EG&G project manager will determine if a proposed alternate radiation monitoring device is equivalent to those items specified below.

5.1 MONITORING DEVICES

- Ludlum Model 12-1A alpha counter with an air proportional probe
- Ludlum Model 4310 alpha sample counter
- Ludlum Model 2000 scaler/timer

5.2 SUPPLIES

- Smear papers sized to fit in the Ludlum Model 4310 alpha sample counter tray
- Plastic bags to contain Ludlum Model 12-1A instrument (excluding the detector probe)
- Microwave oven that is clearly labelled to indicate that it will NOT be used to heat foods or drinks and that it is used to dry potentially radioactive smear test papers
- Replacement probe faces for the Ludlum Model 12-1A
- Swipe material such as Kimwipes
- Glassine envelopes
- Stainless steel scoop

6.0 PROCEDURES

6.1 WORK AREA CHARACTERIZATIONS

Each project area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and includes the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSS)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Surface sediment sampling stations which have not been verified as background locations

See SOP FO.10, Receiving, Labeling, and Handling of Environmental Materials Containers, for specific work areas currently characterized as potentially contaminated.

Sediment sampling stations that have been verified as background stations (uncontaminated) as of December 1990 are listed below.

Sediment Station Number	Location
SED 04	Tributary of Walnut Creek
SED 15	Offsite Gravel Pits
SED 16	Woman Creek Drainage
SED 17	Tributary of Woman Creek
SED 18	Tributary of Woman Creek
SED 19	Tributary of Women Creek
SED 20	Rock Creek Drainage
SED 21	Rock Creek Valley Wall
SED 22	Rock Creek Drainage
SED 23	Rock Creek Drainage

Unless specified in the project specific work plans, all other work areas will be considered as potentially contaminated.

6.2 MONITORING BY EG&G

6.2.1 Monitoring Techniques To Be Used By EG&G

Radiological Engineering-approved contractor Health and Safety Specialists will follow the procedures and apply the contamination limits established for alpha contamination by Radiological Operating Instruction (ROI) 3.1, Performance of Surface Contamination Surveys.

6.2.2 Monitoring Tasks To Be Accomplished By EG&G

Radiological Engineering-approved contractor Health and Safety Specialists will monitor environmental materials containers, sample containers, and equipment exiting potentially contaminated work areas and work areas characterized as not potentially contaminated if monitoring by subcontractors indicates the potential presence of contamination with radioisotopes. Radiological Engineering-approved contractor Health and Safety Specialists will also conduct prework area monitoring of potentially contaminated work sites, excluding surface sediment sampling sites. Prework area monitoring will be scheduled with a Radiological Engineering-approved contractor Health and Safety Specialist as far in advance as possible. A minimum notice of one workday is required.

6.3 MONITORING BY SUBCONTRACTORS

Subcontractors will use one or more of the monitoring techniques described in Subsection 6.3.1 to accomplish the monitoring tasks described in Subsection 6.3.2 without regard to the work area characterization by EG&G.

6.3.1 Monitoring Techniques To Be Used By Subcontractors

At a minimum, disposable protective gloves will be worn when screening procedures are conducted. When the Ludlum Model 12-1A is being used, it will be placed in a plastic bag, with the exception of the probe, to prevent contamination of the instrument.

The following subsections describe the field monitoring techniques that will be accomplished by subcontracting personnel. It is important that the following monitoring techniques be thoroughly understood before the monitoring tasks descriptions provided in Subsection 6.3.2 are reviewed.

6.3.1.1 Monitoring With A Ludlum Model 12-1A

Monitoring with a Ludlum Model 12-1A will normally be done at the work area. It should be noted that alpha radiation will not penetrate the upper layer of a wet surface nor will it travel farther than approximately an inch in air. Therefore, the Ludlum Model 12-1A cannot be used to screen wet surfaces and must be held parallel to and within one quarter inch of the surface being screened.

The Ludlum Model 12-1A count rate meter with an air proportional probe will be used as described in this subsection to monitor environmental materials, samples, and equipment as field work. Direct surface monitoring with a Ludlum Model 12-1A is a relatively speedy method of determining the presence and extent of potential radiological contamination. However, this method will not distinguish between fixed and removable radiological contamination.

The preferable method of using a Ludlum Model 12-1A to monitor for surface contamination is to make sequential overlapping measurements with a stationary probe. However, slowly sweeping the probe over the surface will also produce accurate results if the Ludlum probe is not moved faster than 2 inches per second over the surface being screened and the probe is stopped and held stationary over any indicated counts per minute (cpm) value.

Monitoring results greater than 250 cpm as indicated by the Ludlum Model 12-1A will be considered indicative of the presence of radiological contamination on the surface. Decontamination procedures for various items are contained in the SOPS listed in Subsection 4.2.

6.3.1.2 Monitoring With A Large Area Swipe

Monitoring with large area swipes will normally be accomplished at the work area. Large area swipes are used to detect removable surface radiological contamination. Swipes will be performed by firmly wiping an area greater than 100 square centimeters (cm^2) but not exceeding 1 square meter with a soft absorbent material (i.e., Kimwipes). The monitoring will be completed by using a Ludlum Model 12-1A to monitor that area of the swipe material that contacted the potentially contaminated surface. The swipe being monitored should be relatively flat as it is being screened.

Monitoring results greater than 250 cpm from a large area swipe as indicated by monitoring with a Ludlum Model 12-1A will be considered indicative of the presence of radiological contamination and will necessitate locating the contamination on the surface being monitored by the large area swipe. The contamination will be located by monitoring the surface with a Ludlum Model 12-1A as described in Subsection 6.3.1.1. Decontamination procedures for various items are contained in the SOPs listed in Subsection 4.2.

Environmental Materials found to have an activity greater than 250 cpm as indicated by the Ludlum Model 12-1A will be treated as low-level radioactively contaminated environmental materials. Swipes found to have an activity less than 250 cpm will be handled as uncontaminated environmental materials.

6.3.1.3 Monitoring With A Small Area Smear

Monitoring small areas with smear paper and counting the smears in the Ludlum Model 4310 alpha sample counter is the most sensitive of the three monitoring techniques subcontractors will normally use. Whenever radioactive contamination is detected during the monitoring tasks described in Subsection 6.3.2, small area smears will be done to verify removal of that contamination. Small area smears may be taken from wet surfaces provided that the smears are dried before being counted. A microwave oven may be used to speed the drying process prior to counting.

Use caution when smearing rough surfaces so as not to abrade or tear the smear paper. Damaged smear paper might not provide a representative level of the contamination present. Prior to use, a small "X" will be made with a pencil on the face of the small area smear paper that will contact the surface being monitored. Hold the smear paper between the thumb and fingers, with the back of the smear against the fingers. Place the face of the smear paper against the surface to be smeared. Apply moderate pressure across the smear to ensure that at least one half of the face of the smear comes in contact with the surface being surveyed. Wipe (smear) an area of approximately 100 cm^2 (approximately a 4 inch by 4 inch square). Rotate the smear paper one-half turn and smear the same area again. All smear papers will be handled carefully to avoid cross-contamination and will be identified as to the location/surface smeared, placed in a glassine envelope, and transferred to the Ludlum Model 4310 alpha sample counter for counting after the smear paper is removed from the glassine envelope.

Small area smears that indicate an activity level of greater than 20 disintegration per minute (dpm) as measured with a Ludlum Model 4310 alpha sample counter and Ludlum Model 2000 scaler/timer will be considered as indicative of potential radioactive contamination. Decontamination procedures for various items are contained in the SOPs listed in Subsection 4.2.

Small area smear papers found to have an activity of greater than 20 dpm as measured with a Ludlum Model 4310 alpha sample counter and Ludlum Model 2000 scaler/timer will be treated as low-level radioactively contaminated environmental materials. Small area smear papers found to have an activity of less than 20 dpm will be handled as uncontaminated environmental materials.

6.3.2 Monitoring Tasks To Be Accomplished By Subcontractors

6.3.2.1 Work Areas

Work area monitoring will be accomplished (prior to work starting) to indicate if surficial radioactivity exists in the immediate work area. Prework area monitoring will be accomplished by making direct soil surface measurements with a Ludlum Model 12-1A. A minimum of 17 measurement points will be used for a prework area survey. A grid of the measurement points that is centered on the point of the intrusive activity is depicted in Figure FO.16-1. A measurement of 250 CPM or less as measured by a Ludlum Model 12-1A indicates only background levels of radioactivity are present. At surface sediment sampling sites a single monitoring with a Ludlum Model 12-1A at the sampling point will constitute prework area monitoring. Documentation of area monitoring will be accomplished by completing Section I of Form FO.16A, Results of Radiological Measurements In The Field.

If snow cover is present at a work area or the ground surface is wet, area monitoring shall not be accomplished. In that situation, environmental materials management decisions will be based upon results of monitoring drilling cuttings and drilling cores.

6.3.2.2 Environmental Materials

6.3.2.2.1 Drilling Cuttings. During soil boring and well construction, the point of intrusive activity will be monitored with the Ludlum Model 12-1A before the auger bit is set on the ground.

MINIMUM MEASURMENT
POINTS FOR A PREWORK RADIATION SURVEY
(X = Measurement Point)

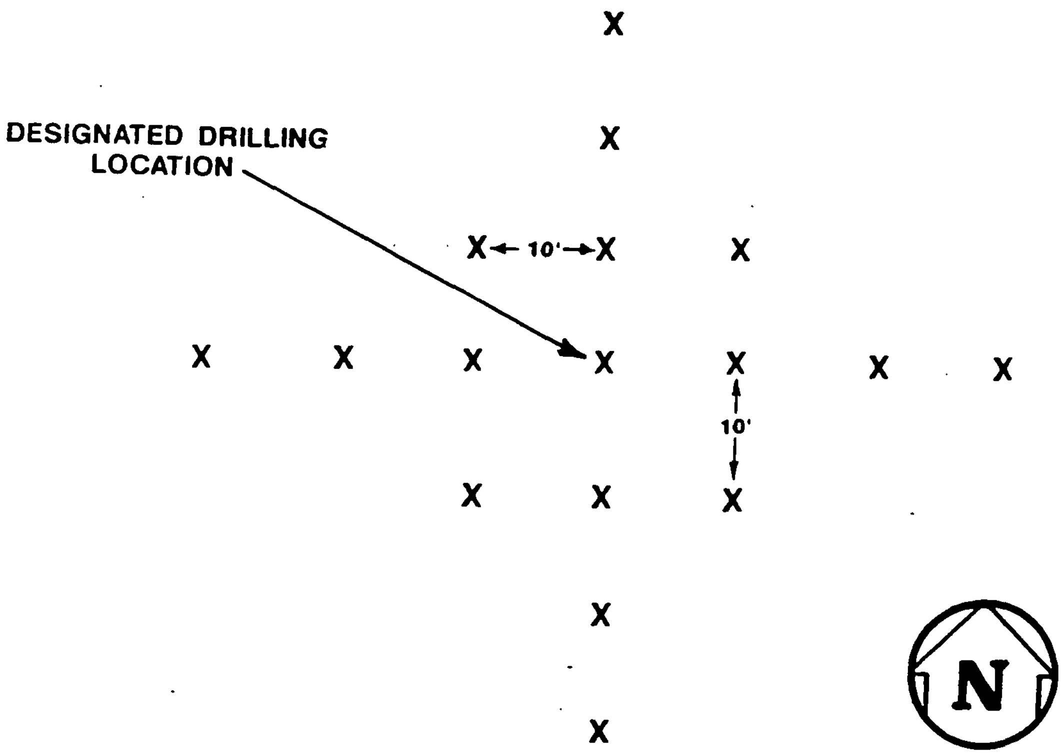


FIGURE FO.16-1

Normally, as the auger starts rotating, the soil cuttings will be wetted as they are generated, and the wetting process will preclude monitoring of the soil cuttings with a Ludlum Model 12-1A. However, each time the auger is stopped for the addition of another auger flight, the accumulated wetted soil cuttings will be removed from the ground around the auger. As the augers begin rotating again, a small (approximately 1 cup) sample will be collected from the dry soil cuttings brought to the surface before the wetting process begins. The sample of dry soil cuttings will be spread evenly over a surface known (by prior monitoring) to be free of radiological contamination and monitored with the Ludlum Model 12-1A. Drilling cutting's monitoring results will be recorded on Form FO.8B, Record of Drilling Fluids And Cuttings, as described in SOP FO.8, Handling of Drilling Fluids and Cuttings.

If the soil cuttings being generated are wet as they appear at the ground surface, monitoring those cuttings with a Ludlum Model 12-1A will not produce useful data. Therefore, the results of small area smears from the interior of the split-spoon sampler will be used.

6.3.2.2.2 Environmental Materials Containers. Sealed environmental materials containers will be monitored in the work area if the work area was characterized as potentially contaminated by EG&G. Sealed environmental materials containers used in an area characterized by EG&G as uncontaminated will also be monitored in the work area if the potential presence of radioactive contamination was indicated during any of the monitoring tasks conducted as field work progressed.

If the environmental materials containers are dry, the top and side will be monitored with a Ludlum Model 12-1A. When monitoring the sides, the long axis of the Ludlum probe will be held parallel to the long axis of the environmental materials container. If the environmental materials container is wet, the top and sides will be monitored with small area smears.

After decontamination at the main decontamination facility, sealed environmental materials containers will be monitored with small area smears if the containers were found to be radioactively contaminated during monitoring tasks completed in the field. Four small area smears will be conducted around the side of the top one-third of each drum. And, the four small area smears will be spaced around the drum so that each individual small area smear is 90° around the drum from the nearest adjoining small area smear site. Documentation of environmental materials container monitoring will be accomplished by completing Section II of Form FO.16A, Results of Radiological Measurements In The Field.

6.3.2.3 Samples

Drilling cores that are dry will be monitored with the Ludlum Model 12-1A after the split-spoon sampler is opened. If the drilling core is wet, a small area smear will be conducted on the interior side of the empty half of the split-spoon sampler. The results of each core monitoring will be assigned to the core number that represents the core screened.

If field radiological monitoring conducted during intrusive activities (see SOP FO.8, Handling of Drilling Fluids And Cuttings) reveals the potential for radioactive contamination, a small area smear of the exterior of the sample container will be taken and the small area smear counting results used to verify decontamination of the sample container. Documentation of sample monitoring will be accomplished by completing Section III of Form FO.16A, Results of Radiological Measurements In The Field.

All drilling core intervals will be monitored and the results recorded. If the space provided is insufficient to record all the monitoring results, additional core monitoring results will be recorded on the reverse side of the form, and an annotation made on the front of the form regarding the location of additional results.

6.3.2.4 Equipment

6.3.2.4.1 Heavy Equipment. In the field, heavy equipment that has been used in an area characterized as potentially contaminated and heavy equipment used in an area characterized as uncontaminated where monitoring tasks indicated the potential presence of radiological contamination will be monitored. Surfaces that have been in direct contact with soil will be monitored with a Ludlum Model 12-1A after contamination-reduction activities have been accomplished as described in SOP FO.4, Heavy Equipment Decontamination. Special attention will be paid to the tires/tracks, augers, etc.

Heavy equipment found to be radioactively contaminated in the field will be monitored with small area smears after decontamination at the main decontamination facility. The small area smears will be accomplished without regard to the results of field monitoring after contamination reduction activities in the field.

Documentation of all heavy equipment monitoring will be accomplished as described in SOP FO.4, Heavy Equipment Decontamination.

6.3.2.4.2 General Equipment. General equipment that has been in direct contact with soil will be screened with a Ludlum Model 12-1A. Large area swipes will be conducted on non-uniform objects and/or surfaces (such as odd shapes, inside surfaces, small items, etc.).

General equipment found to be radioactively contaminated in the field will be monitored by small area smears after final decontamination. The small area smears will be accomplished without regard to the results of field monitoring after decontamination activities in the field.

Documentation of all general equipment monitoring will be accomplished as described in SOP FO.3, General Equipment Decontamination.

6.3.2.4.3 Microwave Oven. Each of the interior surfaces of the heating cavity within the microwave oven will be monitored by small area smears immediately after the oven is used to dry any small area smears collected from potentially contaminated items. If potential radioactive contamination is indicated (see Subsection 6.3.1.3) the oven cavity will be decontaminated by wiping all surfaces with premoistened towelettes, and the effectiveness of decontamination will be verified by conducting additional small area smears after the oven cavity has dried. Small area smear papers that have indicated the potential presence of radioactive contamination within the oven cavity, premoistened towelettes used to decontaminate the oven cavity, and the original smear test paper that resulted in the oven cavity becoming potentially contaminated will be returned (for disposal as low level radioactive environmental materials) to the field activity that generated the original smear test paper.

7.0 DOCUMENTATION

Documentation will be maintained concerning the results of radiological monitoring specified in this SOP. Form FO.16A, Results of Radiological Monitoring In The Field, will be used to record the required information.

Results of Radiological Measurements In the Field

Project Location: ______________________ Date: __________

Project Number: ______________________

I. Work Area Monitoring

Site Number (i.e., bore site, well, sediment, etc.): ______________________

Snow cover present:(Y/N)__________

Work surface wet:(Y/N)__________

Instrument Used (Check appropriate line):

_______ Ludlum Model 12-1A alpha counter with an air proportional probe Serial No._______

_______ Other (Specify manufacturer, model, serial number, and type probe):

Manufacturer:______________

Model: ______________

Serial Number:______________

Type: ______________

Calibration Date:______________

Prework Monitoring Results:

__________cpm at point of intrusive activity

__________highest measured cpm

Illustrate all measurement sites and results on the reverse side of this sheet.

______________________________________ / /

(Printed Name and Signature/Date)

(Subcontractor)______________________ (Phone)______________________

II. Environmental Materials Monitoring

______ Environmental materials monitoring not required. Work area was characterized as uncontaminated and field radiological screening as work progressed did not indicate the presence of potential contamination.

Instrument Used (check appropriate line):

______ Ludlum Model 12-1A alpha counter with an air proportional probe Serial No.______

______ Other (Specify manufacturer, model, serial number and type probe):

Manufacturer:______________

Model: ______________

Serial Number:______________

Type: ______________

Calibration date:______________

____________ (Y/N): PPE screening resulted in a verified positive reading

____________ Background reading

____________ PPE verified positive reading

Drums Monitored By A Ludlum Model 12-1A And Large Area Swipes at the Work Site:

Drum ID No.	Surface Smeared	Results (cpm)

(Printed Name and Signature/Date) (Subcontractor) (Phone)

III. Sample Monitoring:

_______Ludlum Model 12-1A alpha counter with an air proportional probe

_______Smear test counter (Specify manufacturer and model):

Manufacturer:_______________

Model:____________________

Calibration date:_____________

Drilling core intervals monitored and associated sample numbers that the results were assigned to:

Interval(ft)	Highest Level(cpm) Noted	Associated Sample Numbers

Sample containers checked with small area smears and results (cpm)

Sample Number	Initial Wipe Results

(Printed Name and Signature/Date) (Subcontractor) (Phone)

ENVIRONMENTAL SAMPLE RADIOACTIVITY CONTENT SCREENING

EG&G ROCKY FLATS PLANT		Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP		Procedure No.:	FO.18, Rev. 0
		Page:	1 of 12
		Effective Date:	August 30, 1991
Category 2		Organization:	Environmental Management

This is a CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

TITLE:
ENVIRONMENTAL SAMPLE
RADIOACTIVITY CONTENT
SCREENING

Approved By:
J. W. Langman 9/1/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

LIST OF FIGURES

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE

This procedure is intended to ensure that the samples collected as part of the Environmental Management (EM) Division activities are handled, transferred, and shipped in a manner consistent with their actual or projected radioactivity content/concentration. This procedure addresses:

- Applicable regulations/requirements
- Contractual agreements, and
- EG&G Rocky Flats Plant (RFP) policies, procedures, and requirements.

Proper radioactive content screening for shipment/transfer of samples to the appropriate laboratory is outlined. The procedure also addresses restrictions on the selection of the laboratory for screening and sample analysis based on the criteria for shipping and the limitations of the laboratory (e.g. license restrictions). The screening process is summarized in the flow diagram in Figure FO.18-1.

3.0 SCOPE

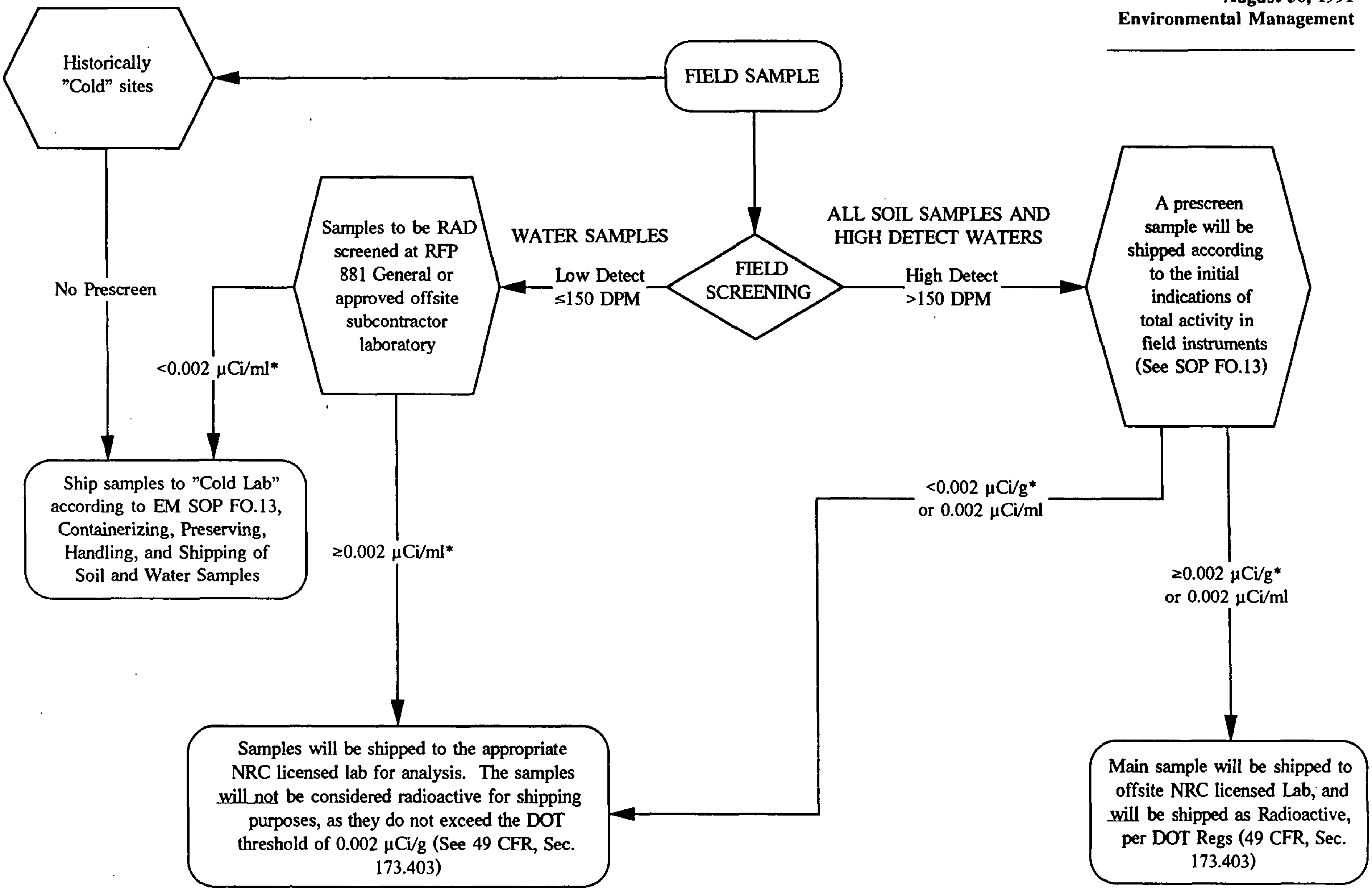
This procedure will be used by qualified subcontractor and EG&G personnel to select laboratories for screening and analysis of samples collected during EM activities. The procedure includes input for the selection of packaging and documentation for shipment, as related to radioactive material.

4.0 REFERENCES

4.1 SOURCE REFERENCES

DOE Order 5400.6, "Radiation Protection of the Public and the Environment."

FIGURE FO.18-1
SCHEMATIC OF RADIATION PRESCREENING



* Total alpha/beta activity

(4011-700)(Figure FO.18-1)(8/23/91)

DOE Order 5490.11, "Radiation Protection of Occupational Workers."

10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material" (or equivalent agreement State requirements).

10 CFR 40, "Domestic Licensing of Source Material" (or equivalent agreement State requirements).

10 CFR 70, "Domestic Licensing of Special Nuclear Material" (or equivalent State requirements).

49 CFR, "Transportation," Subpart I-Radioactive Materials, Sections 173.401 to 173.478.

EG&G Rocky Flats Plant "Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities."

EG&G Rocky Flats Plant Transportation Manual, Traffic Department.

EG&G Rocky Flats Plant Health & Safety Procedures Manual.

4.2 INTERNAL REFERENCES

A related SOP cross-referenced in this procedure is:

- FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples.

5.0 PREREQUISITES

Determine the projected upper limit activity for surface water sample locations, based on historical data for the locations. Areas for which no historical data are available must be screened according to this procedure.

Identify the potential analytical laboratories for aliquot screening and sample analysis based on direction from EG&G Radioanalytical Program Chemist. Arrange for the completion of the aliquot screen and sample shipment to appropriate laboratory.

If sampling involves entry into radiological areas or sampling of potentially contaminated materials, follow the Health and Safety procedures for entry and/or sampling in these areas. Radiological Engineering-approved contractor Health and Safety Specialists support is required for sampling on RFP. Arrange for Radiological Engineering-approved contractor Health and Safety Specialists support, as needed, based on the planned sampling locations.

6.0 LIMITATIONS AND PRECAUTIONS

Samples with total activity $\geq 0.002\ \mu Ci/g$ must be shipped "Radioactive" and in compliance with the applicable EG&G RFP requirements listed in the EG&G RFP Transportation Manual and the Plant Health and Safety Procedures Manual.

Environmental samples are considered non-radioactive unless historical data or field screening indicates a total activity greater than $0.002\ \mu Ci/g$.

When entering a radiological area, follow all applicable Health and Safety postings, practices, procedures, and instructions. This includes considerations to assure that all radiation exposures (internal and external) are "as low as reasonable achievable" (ALARA).

When implementing the activities in this procedure assure that the chain-of-custody (COC) of the samples is maintained (see RFP Health and Safety Procedures Manual and SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples).

7.0 PROCEDURE

7.1 SUMMARY

Radiological screening and classification of samples is performed to determine which samples may be analyzed by non-licensed laboratories, establish radiation work requirements, and to evaluate sample activity in terms of license and shipping limits.

7.2 ANALYSIS/OPERATION

7.2.1 Selection of Samples for Screening

Sample screening will be performed on the following types of samples from the RFP facility:

- Samples to be shipped to nonlicensed laboratories, unless an exception is made as stated below.

- Materials that are classified as waste. These materials are usually contained in drums, tanks, or ponds. A wide variety of matrices are encountered including liquids (often multi-phased), sludges, and heterogeneous solids.

- Samples of materials from process streams where radioactive materials are utilized.

- Environmental samples from within the **controlled** areas of the RFP facility. These samples include soil, sludges, sediments, and water. Controlled areas are defined as areas where there is a reasonable risk for exposure to radiological health hazards.

Sample screening is not required for the following types of samples from the RFP facility:

- Filters, charcoal tubes, impinger solution, etc. from samples collected to measure ambient or breathing zone concentrations of airborne contaminants.

- Bioassay samples.

- Samples of plant or animal life (biota).

- Environmental samples including soil, sediments, and water from the environs outside RFP's **controlled** areas.

- Drinking water samples.

Samples shall be collected, shipped, stored, identified, and documented in an ordered sequence as shown in the Radiation Screening Schematic, Figure FO.18-1. A sample suite is collected in the field that includes a sample designated for radiation screening (RAD screen) when no historical data is available for a specific site.

The RAD screen is packaged and shipped to a licensed laboratory that is aware of the potential for radioactivity. The remainder of the sample suite is appropriately stored, pending the RAD screen analysis and categorization. COC procedures are observed for analytical activities.

Samples shall undergo field screening and shall be segregated as: low detect (≤ 150 DPM) or high detect (> 150 DPM) as shown in Figure FO.18-1.

Water samples with ≤ 150 DPM will be screened by the 881 General Lab per the L-6114 Procedure for Gross Alpha/Beta or an approved offsite subcontractor.

For water samples with activity > 150 DPM and for all soil/sediment samples, an aliquot shall be shipped to an appropriately licensed laboratory for screening.

As indicated in Figure FO.18-2, Classification of Samples, if the screen results in: a total activity value of less than 0.002 μCi/g and a gross alpha activity of <0.01 μCi/sample and gross beta activity of < 0.1 μCi/sample, the sample may be shipped to an unlicensed laboratory for analysis. These samples shall be designated as Category I type. These samples are not considered radioactive for shipping purposes, as they do not exceed the DOT threshold of 0.002 μCi/g.

If the screen results in: a total activity of <0.01 μCi/g and a gross alpha activity ≥ 0.01 but <0.1 μCi/sample and a gross beta activity of ≥ 0.1 but <1 μCi/sample, the sample shall be shipped to an appropriately licensed laboratory. These samples are designated as Category II type. If the sample activity is >0.002 μCi/g, the sample is labelled "Radioactive" and appropriately shipped offsite to an NRC licensed laboratory per the instructions in 10 CFR 40, Domestic Licensing of Source Materials and the RFP Site-Wide QAPjP. (See Figure FO.18-2.)

Upon completion of the RAD screen at the designated laboratory, results are documented for transmittal to the field shipping clerk and the sample coordinator.

The laboratory staff member with responsibility for reporting transmits the RAD screen results to the sample coordinator and field shipping clerk. The sample coordinator receives a facsimile of the results. The shipping clerk is contacted by telephone.

FIGURE FO.18-2
CLASSIFICATION OF SAMPLES*

CATEGORY I
gross alpha <0.01 μCi/sample gross beta <0.1 μCi/sample total activity <0.002 μCi/gram

CATEGORY II Limits per Sample
<0.1 mR/hr Contact
<0.01 μCi/g Total Activity
Gross Alpha** ≥0.01 but <0.1 μCi/sample Gross Beta** ≥0.1 but <1 μCi/sample
Follow safe lab practices for handling radioactive materials

* Sample classification is determined by comparing sample screening results to category limits. If screening results exceed any of the limits for a given category, the results should then be compared to the limits of the next higher category.

** If the radiological contaminants in the sample are known to be only U-natural, U-238, Th-natural, Th-232, (or their daughters) or H-3, the classification should be based on 10 times the limits given above. For example, Category III limits for U-238 would correspond to a gross alpha activity of 1 μCi or a gross beta activity of 10 μCi.

The shipping clerk documents the transmission of analytical results and the shipping destination of the samples on the Sample Screening Release Form, Form FO.18A (see Section 8.0, Documentation).

The laboratory contact will provide the screening results to the shipping clerk.

These samples are not considered radioactive for shipping purposes if they do not exceed the DOT threshold of 0.002 μCi/g (See EG&G RFP Transportation Manual).

Irrespective of the requirements listed above, the respective Laboratory Radiation Officer has the final authority to determine which samples will be screened prior to shipment to that lab.

7.2.2 Selection of Approved Screening Methods

The sample screening method selected shall be appropriate for the types of radiological contaminants present in the sample.

The analytical detection limit for the screening method selected shall be adequate to detect gross alpha activity of 0.01 μCi/sample and gross beta activity of 0.1 μCi/sample when the concentration is multiplied by the sample volume (or mass).

An example of an approved screening method for Waters/liquids/soils is:

- A homogenized sample aliquot (approximately 4 mls for liquids and 1 gram for soils) is placed on a tared planchet and dried under a heat lamp. The aliquot is brought to a constant weight at room temperature and counted for gross alpha/beta activity with a gas flow proportional counter.

Laboratories performing screening will be required to submit for approval to the Radioanalytical Program Chemist SOPs which encompass the following:

- Radiological Screening and Classification of Samples
- Calibration and Operation of Gas Flow Proportional Counters
- Calibration and Operation of a Germanium Gamma Spectrometer.

Additional methods may be used but must be adequately documented in standard operating procedures and shall specify the method detection limits.

Screening data shall be transmitted to the laboratory in the following format:

- Sample identification;
- Total specific activity of the sample in units of μCi/g;
- Gross alpha/beta activity in units of μCi;
- Isotopic analysis in units of μCi may be substituted for gross alpha/beta activity if all sample radioactivity is accounted for by this method.

7.2.3 Classification of Samples

Samples shall be classified based on the total activity of the sample, the specific activity, and the contact exposure rate.

Total sample gross alpha/beta activity is based on the total quantity of radioactive material per sample container.

Samples classified as <0.002 μCi (Category I) are considered exempt from licensing requirements and may be transferred to non-licensed laboratories. These samples are of sufficiently low activity to require no special handling procedures.

Extracts of samples shall be given the classification of the original sample. The laboratory radiation safety officer may elect to reclassify the extract based on additional measurements or on knowledge of the extraction procedure.

Samples shall not be released for analysis until properly classified.

8.0 DOCUMENTATION

The signature on Form FO.18A, Sample Screening Release Form, verifies and authenticates the completion of this procedure and the accuracy of the data/information recorded.

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT FORM FO.18A

SAMPLE SCREENING RELEASE FORM

Matrix ________ COC# ______
SDG# ______
Batch# ______

Client ID	Lab #	Total Activity in μCi	
		Alpha	Beta

Below Category I Release Limits __________ yes __________ no

If no, specify the samples above Category I

____

Precautions: ____

____

Approval for Release ______________________________ Date ____________

Form ____________________

(4011-600-0020)(FO18REV.1)(09/11/91)

EG&G ROCKY FLATS PLANT		Manual:	5-21000-OPS
EMD MANUAL OPERATION SOP		Procedure No.:	FO.19, Rev. 1
		Page:	1 of 6
		Effective Date	August 30, 1991
Category 2		Organization:	Environmental Management

THIS IS A CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

TITLE:
BASE LABORATORY WORK

Approved By: J. W. Langman J. 9/12/91
(Name of Approver) (Date)

1.0 TABLE OF CONTENTS

"REVIEWED FOR CLASSIFICATION
By [signature]
Date 9/5/91"

2.0 PURPOSE AND SCOPE

The purpose of this standard operating procedure (SOP) is to define procedures routinely performed at a base laboratory at the Rocky Flats Plant (RFP). The goal of the base laboratory is to obtain and document data in order to meet acceptable standards of accuracy, precision, comparability, representativeness, and completeness. This document is intended to provide details so that all personnel perform base lab tasks consistently.

The base lab is to be located in an area designated by the EG&G project manager. This facility will be utilized by the contracting party for activities described, but not limited to those listed as follows:

- As a staging area for personnel sampling activities
- As a storage and preparation area for sample containers and to compile sample sets
- As a receiving, preparation, and shipping area for samples collected in the field
- For equipment calibration and secure storage

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Only qualified personnel will be allowed to perform these procedures. Required qualifications vary depending on the activity to be performed. In general, qualifications are based on education, previous experience, on-the-job training, and supervision by qualified personnel. Personnel will be geologists, chemists, hydrologists, environmental scientists, engineers, or field technicians with an appropriate amount of applicable experience or on-the-job training under supervision of another qualified person.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure.

A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Interim Final. October 1988.

RCRA Facility Investigation Guidance. Interim Final. May 1989.

Standard Methods for the Examination of Water and Wastewater. 17th Edition. 1989, et. seq. APHA-AWWA-WPCF.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are:

- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples
- SOP FO.14, Field Data Management

- SOP SW.2, Field Measurement of Surface Water Field Parameters

5.0 METHODS

Base lab procedures will be performed as described in the following subsections. The order in which tasks are performed may vary depending on time requirements or other day-to-day events.

5.1 PRE-FIELD ACTIVITIES

Provisions will be made at the base lab for an area where personnel may change from their street clothes into field clothing appropriate to the season. No personal protective equipment (PPE), clean or otherwise, will be worn in these areas.

Equipment used for field measurement of field parameters will be calibrated and/or standardized before use by designated personnel in accordance with applicable SOPs. An area of the base lab facilities will be dedicated for this purpose.

Coolers or other containers for transporting sample containers, prelabeled and identified by the sample manager, will be assembled for use by field personnel. Coolers or other containers will be stocked with the sample containers needed for the day's sampling activities. The sample manager will ensure that preservatives are provided for those samples requiring preservation. Glass containers will be placed into the coolers or other containers in such a manner as to prevent breakage while being transported to and from the sampling site(s).

Field crews will be responsible for the inventory of sampling supplies and equipment in the field vehicles and ensuring that necessary items are on hand to complete the day's activities prior to leaving the base lab. They will report the status of quantities of supplies in storage at the base lab to the site manager and/or equipment manager in time to reorder and receive items before the stock is depleted.

Each field team leader will ensure that field folders pertaining to the day's activities are obtained from the base lab office files and, if necessary, that security personnel or other concerned personnel are notified of the day's intended activities.

5.2 BASE LABORATORY ACTIVITIES

The site manager will assign personnel responsible for proper pre-use calibration and post-use standardization practices. An adequate supply of all standards and solutions will be maintained and records of calibration/standardization activities will be filed in a secured area at the base lab office.

The sample manager will interface with the contracted chemical laboratories and provide control of sample containers, field samples, and related activities in accordance with SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples.

The sample manager will utilize available time while teams are in the field to prepare solutions and supplies for the following day's activities.

5.3 POST-FIELD ACTIVITIES

Crews returning to the base lab from field sampling activities will deliver radiation screening samples to the on-site laboratory or sample manager.

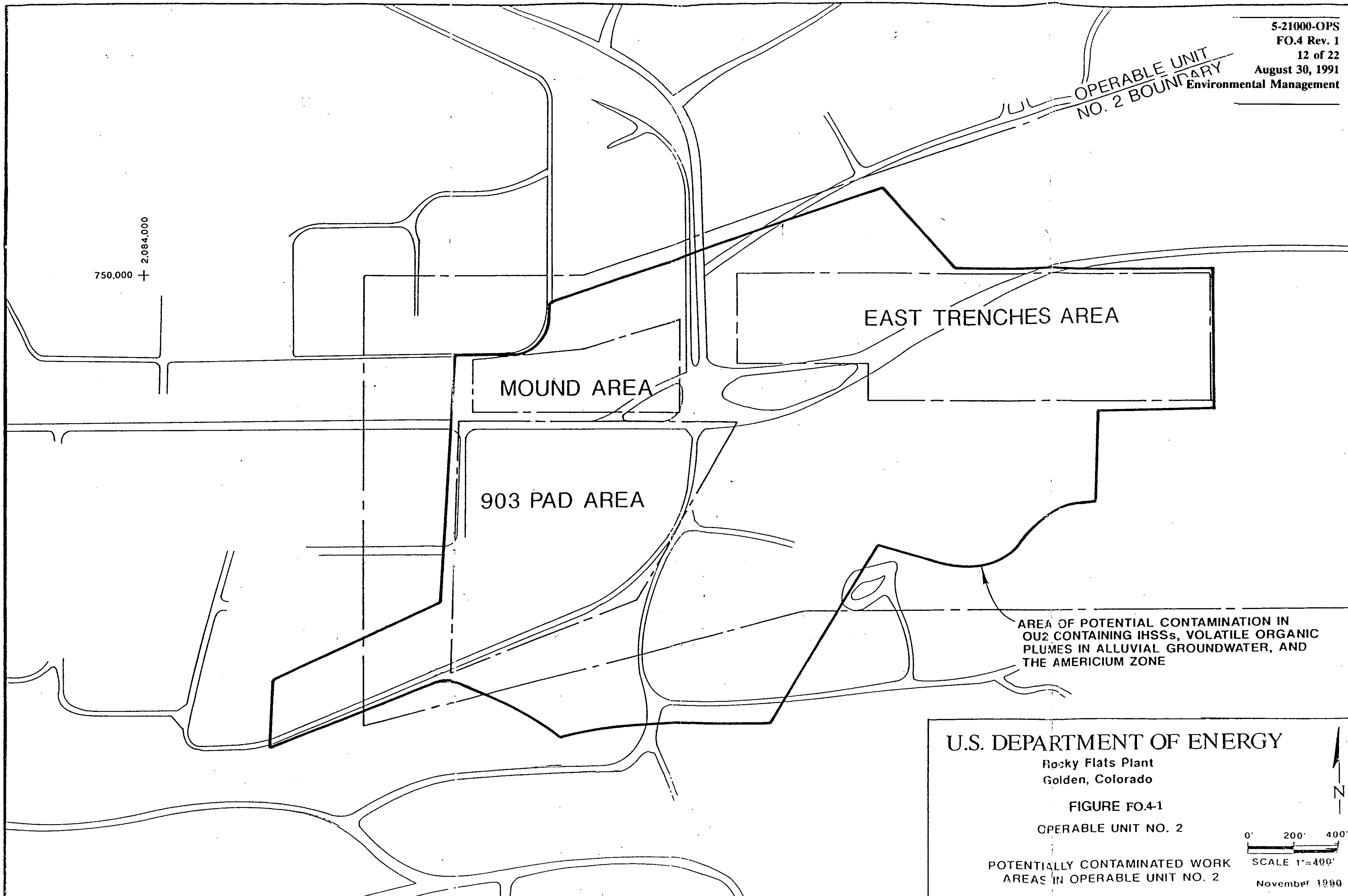
Contact with the sample manager will be made immediately upon arrival at the base lab, and samples transferred to his/her custody. One member of the delivering field crew will assist the sample manager in preparing the samples for storage and/or shipment.

A designated person will perform post-use instrument calibration/standardization procedures according to applicable SOPs. Instruments will be stored in a locked room when field or base lab personnel are not present.

Data forms not completed in the field will be completed after each day's activities. Forms will be completed in accordance with SOP FO.14, Field Data Management.

Field personnel will remove refuse from the vehicles and properly dispose of it in accordance with SOP FO.6, Handling of Personal Protective Equipment; SOP FO.7, Handling of Decontamination Water and Wash Water; and SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

The base lab facilities will remain locked when project personnel are not present. The last person out is responsible for ensuring that all accesses to the facility are properly secured (that is, locked) before leaving at the end of the workday.



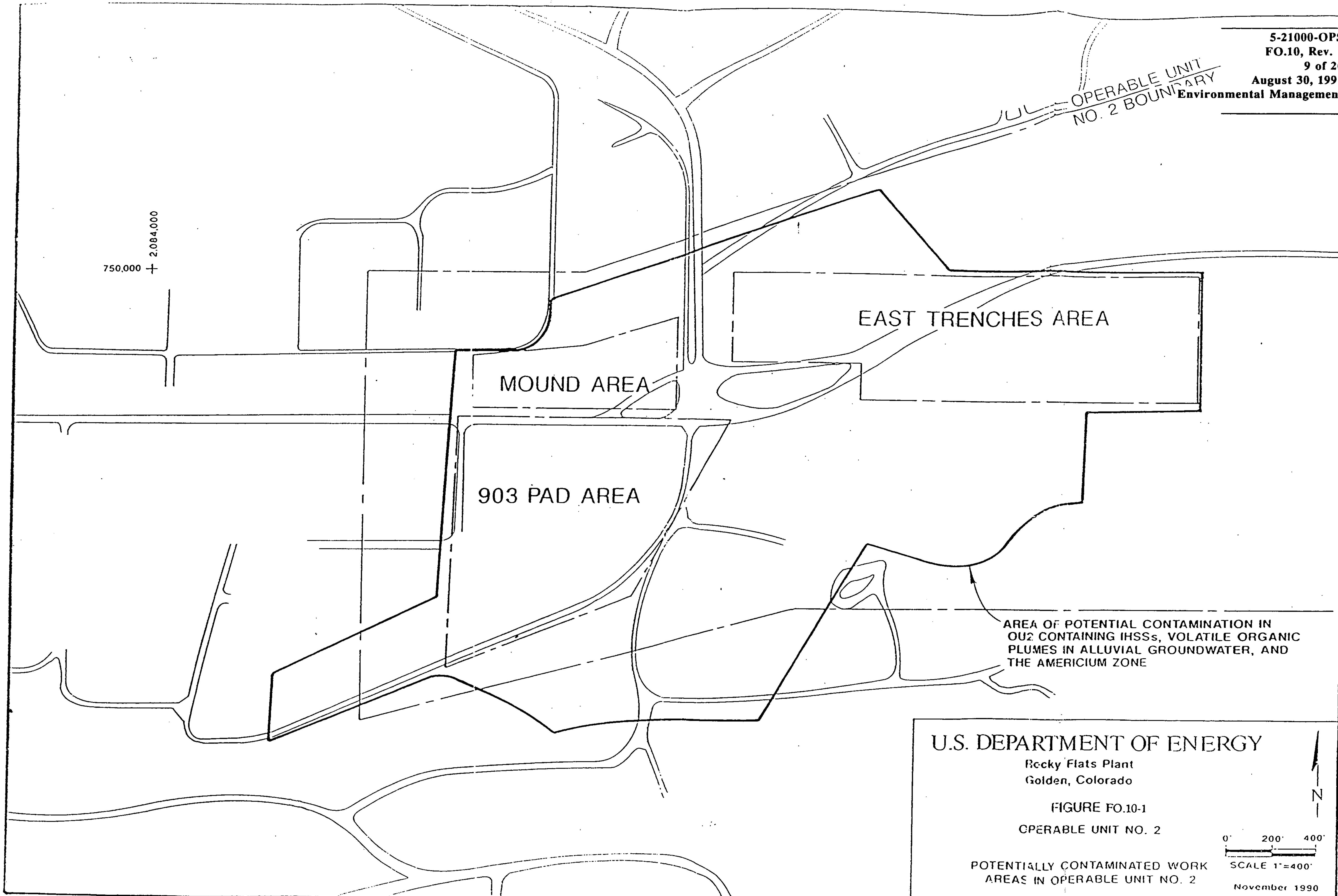
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE FO.4-1

OPERABLE UNIT NO. 2

POTENTIALLY CONTAMINATED WORK AREAS IN OPERABLE UNIT NO. 2

November 1990



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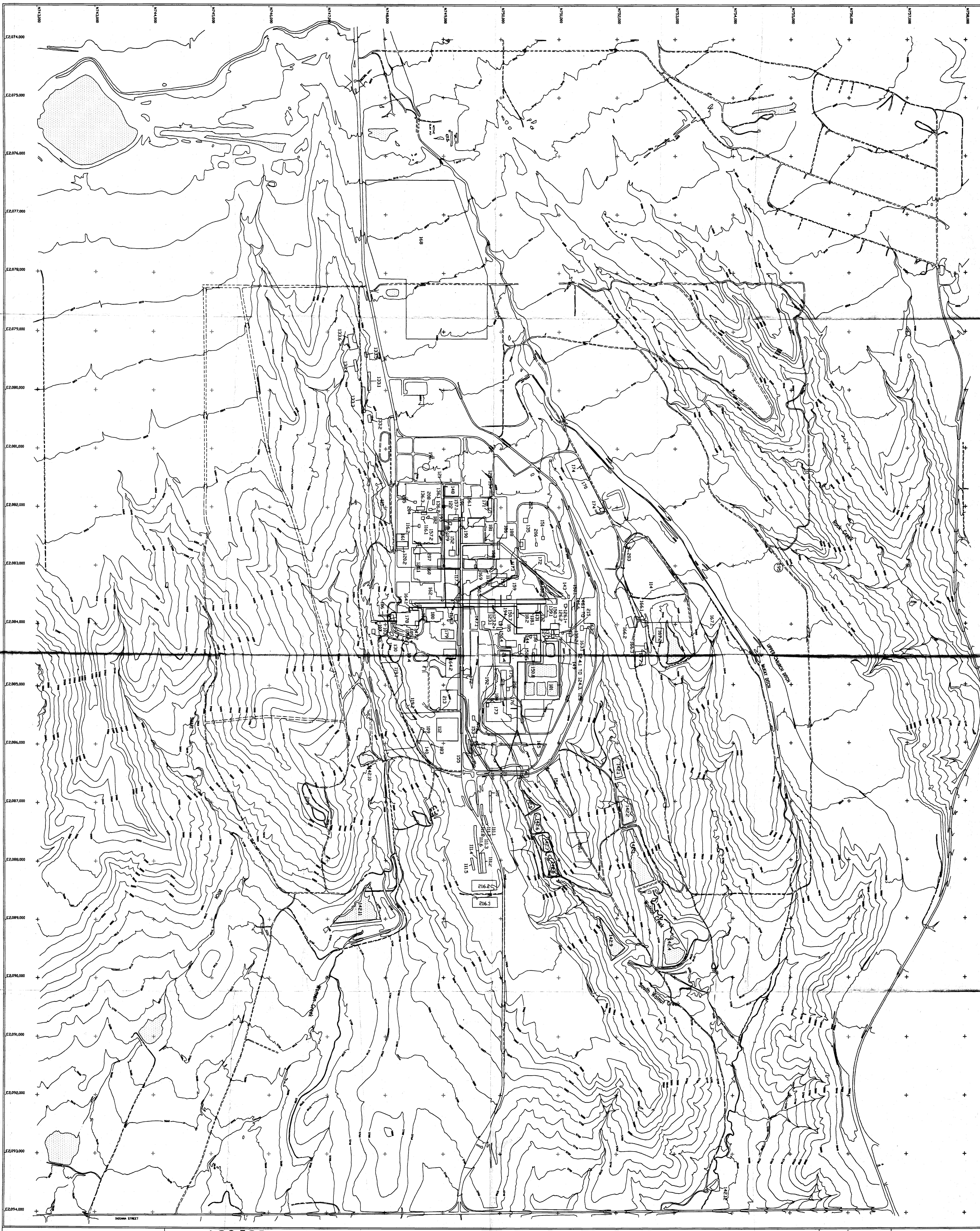
Rocky Flats Plant
Golden, Colorado

FIGURE FO.10-1

OPERABLE UNIT NO. 2

POTENTIALLY CONTAMINATED WORK AREAS IN OPERABLE UNIT NO. 2

November 1990



U.S. DEPARTMENT OF ENERGY

ROCKY FLATS PLANT
Golden, Colorado

INDIVIDUAL HAZARDOUS SUBSTANCE SITES

Max : Scale 1" = 617.28'
E size : Scale 1" = 641.03'
D size : Scale 1" = 1,219.51'
C size : Scale 1" = 1,315.79'
B size : Scale 1" = 2,083.33'
A size : Scale 1" = 2,631.58'

CONTOUR INTERVAL = 20'

N

121 ORIGINAL PROCESS WASTE LINE

143.2 INDIVIDUAL HAZARDOUS SUBSTANCE SITES

NO.	DATE	REVISION

SW #123 SW-A-000123